FEB 15 1929

American Journal of Public Health

And *The Nation's Health*

Volume XIX February 1929 Number 2

Typhoid Fever
HERVEY

Our Accident Problem
SCOTT

Calmette's BCG Vaccine
KING, PARK

Ultra-Violet Ray
GERSTENBERGER

Industrial Hygiene and Tuberculosis
COLEMAN

Published by the
American Public Health Association

GILLILAND
BIOLOGICAL PRODUCTS

Prepared under U. S. Government
License No. 63

Diphtheria

TREATMENT

Gilliland Diphtheria Antitoxin, being highly concentrated and low in total solids, minimizes the dangers of severe anaphylactic reactions. Doses are small in bulk with ample excess to insure full potency for the period dated on the packages.

Supplied in our improved syringe containers of 1,000, 3,000, 5,000, 10,000 and 20,000 Units.

PREVENTION

Gilliland Toxin-Antitoxin confers permanent immunity against Diphtheria. This immunity develops in about 8 to 12 weeks and continues effective for many years — possibly for life.

Gilliland Toxin-Antitoxin is prepared from Antitoxin of both horse and goat origin.

Supplied in the following style packages:

3–1cc Syringes (1 Immunization)	10cc Vial (3 Immunizations)
3–1cc Ampuls (1 Immunization)	20cc Vial (6 Immunizations)
30–1cc Ampuls (10 Immunizations)	30cc Vial (10 Immunizations)

SUSCEPTIBILITY

Gilliland Schick Test material is accurate in determining the susceptibility to Diphtheria.

Supplied in packages containing Diphtheria Toxin and Saline Solution sufficient for 25 and 50 tests.

ANTITOXINS

VACCINES SERUMS

THE GILLILAND LABORATORIES, INC.
MARIETTA, PA.

American Journal of Public Health
and THE NATION'S HEALTH Vol. XI No. 2

Volume XIX February, 1929 Number 2

Our National Accident Problem*

CHARLES B. SCOTT

President, Bureau of Safety, Chicago, Ill.

IT was estimated that in the year 1927 there were 95,500 persons killed in accidents in the United States, an increase of 4 per cent over 1926. If the increase this year is as great, the number for 1928 will be almost 100,000. The probable loss of 100,000 lives in accidents in one year certainly constitutes an important national problem.

Its importance is emphasized by a comparison with other causes of death. U. S. Bureau of the Census figures for 1926 indicate that in that year there were only 6 diseases with higher death rates than the rate for accidents. These were heart disease, pneumonia, nephritis, cancer, tuberculosis, and cerebral hemorrhage. For men only the importance of accidents is even more striking. In the year 1926 there were only 2 diseases among men which caused more deaths than were caused by accidents. These were heart disease and pneumonia. For women only, accidents stand 7th in importance among the various causes of death.

We have not sufficient information to classify accurately these 95,500 fatalities in accordance with the place where the accident occurred. We do know quite definitely, however, that about 25,800 of them were the result of automobile accidents. This is an increase of 1,050 per cent in number of deaths since 1911, and an increase of 400 per cent in the death rate per 100,000 population since 1913. This information on automobile deaths is made available through the records of the U. S. Bureau of the Census. But to what are the remaining 70,000 deaths due? In addition to these motor vehicle accidents there are several other main groups of accidents on which our information is less complete. There are in addition to motor vehicle acci-

* Read before the Vital Statistics Section of the American Public Health Association at the Fifty-seventh Annual Meeting at Chicago, Ill., October 16, 1928.

dents other accidents that occur in public places but where a motor vehicle is not involved. In addition there are accidents occurring in industry and in homes. By a process which necessarily includes a great deal of guess work, statisticians of the National Safety Council estimate that about 25,000 of these 70,000 deaths occur in home accidents, another 25,000 in industrial accidents, and the remaining 19,700 in public (not motor vehicle) accidents.

The seriousness of our accident problem is emphasized by a comparison with those in other countries. Whereas the death rate from accidents in this country in 1926, according to the U. S. Bureau of the Census reports, was 78.6, the accidental death rate in England and Wales was only 35.6, in Scotland 44.9, and in New Zealand 52.3. These are the only foreign rates available but I am sure that if the records of other countries were before us we should find the United States well in the lead on the question of accidents as a cause of death.

Some interesting changes have occurred in accidental death rates over a period of years. In 1913, which is ordinarily taken as a normal pre-war year, the death rate from accidents was 85.5 per 100,000 population. This may be contrasted with the 80.5 per 100,000 in 1927, which is a drop of 6 per cent. The decrease has not been a consistent one, however, there being a gradual decline up to 1921 when the accidental death rate was 68.7 and an increase since that time. The decrease from 1913 to 1921 was 20 per cent and the increase from 1921 to 1927, 17 per cent. If the accidental death rate in 1927 had been as high as in 1913 there would have been 101,400 lives lost in accidents last year, or 5,900 more than the actual loss. If, however, the 1927 rate had been as low as that of 1921 the loss would have been only 81,500, 14,000 less than actually met death in this way.

The death rates from accidental causes are by no means uniform in the various age groups. Children are particularly subject to the hazards of accidents. On the basis of U. S. Bureau of the Census data there are only 2 diseases which cause more deaths among children from 1 to 4 years of age than accidents. These are bronchial pneumonia, and diarrhea and enteritis. Between the ages 5 and 14 years the situation is even more severe, for we find that accidents cause more deaths than does any disease. No one will deny that tuberculosis takes a heavy toll of lives between the ages 10 and 20 years and yet we find that in the first half of this period accidents cause twice as many deaths as tuberculosis, and in the second half two-thirds as many deaths as tuberculosis. These figures prove beyond any doubt that the national accident problem is indeed a serious one.

Organized safety work began in industry. The National Safety

Council was formed by industrial people who realized the importance of accidents both in their own plants and to society as a whole. Over the last 15 years interest in accident prevention work has extended to every phase of our national life, and therefore the scope of the council's activity has accordingly broadened. Throughout all this development it has again and again been proved that effective accident prevention work must be based upon complete data relative to accident causes. This is strikingly true in the industrial accident field, in which I have had most of my personal experience in accident prevention work. May I mention just one experience?

Very complete records of accidents that were kept under my supervision of safety work in certain public utilities indicated that, over a period of years, only 7 per cent of the accidents were charged to electricity. On the face of it this would not seem to be outstandingly important among all causes of accidents. However, further investigation of the records showed that these same accidents, while they amounted to but 7 per cent of the total number of accidents, resulted in 75 per cent of the total number of fatalities. This was clear evidence of the importance of the electrical hazard, and of the necessity for more stringent requirements to combat it. This is mentioned to show that detailed information on the circumstances and causes of accidents should form the basis of effective prevention work.

We are not sure how rapidly the industrial accident problem is being solved, because complete data on the subject are not available. We do know that in many instances industrial firms by careful analysis of their accident records, and persistent application of safety methods, have produced amazingly fine results. But at the very best the only information about accidents that can be obtained by industries will relate to industrial accidents only, and as a matter of fact it is only in industries covered by compensation laws that we have gotten very far along this line. We need data on industrial accidents that are not covered by compensation laws and we need data on the other 70,000 fatalities each year.

DISCUSSION

W. THURBER FALES, FELLOW A. P. H. A.

State Registrar, State Board of Health, Montgomery, Ala.

THE ever increasing toll in life and economic loss of accidents in this country demands attention not only of bureaus of safety, traffic managers, and factory superintendents, but demands the serious attention of the health authorities of America. Accident prevention requires the attention of health authorities because

deaths by accident form a considerable portion of the total death rate. In 1910 the death rate from the 5 infectious diseases, typhoid fever, measles, scarlet fever, whooping cough and diphtheria, was 80.2 and the death rate from all accidental deaths (homicides and suicides exclusive) was 84.4. In 1926 the corresponding rates were 35.6 for the 5 infectious diseases and 78.6 for total accidents. In 1910 typhoid fever death rate was 23.5, and that from automobile accidents was 1.8; the rates for 1926, of 6.5 and 17.9 respectively, show that the saving in lives from reduction of typhoid fever has been nearly counterbalanced by the increase in the deaths from automobile accidents. In other words, we saved 17 lives from typhoid fever in each 100,000 population and lost 16 additional lives through fatal automobile accidents.

Further, the large number of children who lose their lives daily through preventable accidents moves all who are interested in the conservation of child life. For example, 27.1 per cent of accidental deaths in Alabama are of children under 15 years of age, 19.3 per cent of fatal automobile accidents and 57.5 per cent of accidental burns.

Before a constructive and educational program for accident prevention can be carried out, we agree with Mr. Scott that more facts concerning the incidence of and circumstances under which accidents occur must be had. We all recognize the inadequacy of the classification of accidental deaths of the International List. Radical changes in this classification are not to be expected, and perhaps justifiably so if comparability with our past statistics on fatal accidents is to be preserved. Further, the enlargement of the death certificate to furnish additional information is out of the question. Therefore, additional information must be secured through some form of supplemental report.

It should be remembered that the supplemental report must be simple and that in most instances, for the present at least, it must be filled out through the voluntary coöperation of registrars, coroners, undertakers and others. Our daily querying of death certificates shows that doctors, registrars and undertakers will answer supplemental questions if pertinent to the case.

During the last couple of years Miss Hawley, my assistant, has queried all deaths from burns in order to secure information as to cause. This information has been valuable especially in showing the tremendous importance of unprotected fireplaces in this particular problem.

At the meeting of the Public Accident Statistics Section of the National Safety Congress in New York, October 2, 1928, Dr. DePorte proposed a very simple form for use by state registration offices. This form appears entirely practicable. Alabama purposes using a similar form, modified in unimportant details, next year to secure supplemental data concerning fatal accidents. We hope that many states represented at this meeting will undertake the securing of additional information in case of fatal accidents and I believe that for the present the National Safety Council would be the logical agency to correlate the reports from the various states on this problem.

The Biochemical Oxidation of Phenolic Wastes*

F. W. MOHLMAN, PH. D.

Chief Chemist, The Sanitary District of Chicago, Chicago, Ill.

THE biochemical oxidation of phenolic wastes mixed with sewage undoubtedly appeals strongly to the manufacturer, since this method of disposal is very convenient and of low cost from his standpoint. Before recommending such a method of disposal it is desirable to have considerably more information than we now have concerning the effect of these wastes on the rates of treatment of sewage on trickling filters and in the activated sludge process. Ammonia-still wastes contain organic solids which affect materially the character and composition of sewage. Increase in concentration of sewage requires larger acreage of trickling filters or increased aeration period and air consumption in the activated sludge process. It is conceivable that increased cost of operation of the sewage works receiving such wastes might be far greater than the cost of treating the wastes at the by-products coke plant.

Phenolic wastes are produced in two by-products coke plants in South Chicago, namely the By-Products Coke Company and the Wisconsin Steel Company.[1] A third plant, a subsidiary of the Youngstown Sheet and Tube Company, started operation in October, 1928. This plant is directly at the mouth of the Calumet River, a short distance from the 68th Street intake of the Chicago water supply. It would be quite unsafe to discharge ammonia-still wastes into the river or the lake at the Youngstown plant; consequently, studies have been made by the Sanitary District of Chicago concerning the practicability of discharging these wastes into the intercepting sewer tributary to the Calumet Sewage Treatment Works. In connection with these studies research has been carried on in the laboratories of the Sanitary District on the general subject of phenol wastes in sewage. This paper deals with some of the results of these studies.

In our main laboratory increasing concentrations of ammonia-still wastes were added to samples of settled sewage from Des Plaines Treatment Works, which is of average strength and contains no indus-

* Read before the Public Health Engineering Section of the American Public Health Association at the Fifty-seventh Annual Meeting at Chicago, Ill., October 18, 1928.

TABLE I

CHEMICAL ANALYSIS OF AMMONIA-STILL WASTE—MAYWOOD SEWAGE MIXTURES

Parts per Million

August 29, 1928	Nitrogen as			Biochemical Oxygen Demand		Suspended Solids			Oxygen Consumed $KMnO_4$	Alkalinity as $CaCO_3$	Phenol (calculated)	Total Solids	pH	Bact. Counts Agar 48-hour
	Total Organic +Amm.	Org.	Amm.	5-day	10-day	Total	Volatile	Fixed						
Raw Sewage	18.6	3.4	15.2	110	120	74	58	16	25.0	320	0.02	1134	7.4	343,000
R.S. + ½% Waste	19.4	4.2	15.2	136	170	82	64	18	58.8	322	14.5	1152	7.5	380,000
R.S. + 1% Waste	21.0	5.6	15.4	165	210	87	54	33	125.0	324	28.9	1196	7.5	880,000
R.S. + 2% Waste	23.4	7.8	15.6	200	225	108	72	36	181.0	328	57.8	1222	7.5	880,000
R.S. + 3% Waste	25.8	9.8	16.0	247	310+	136	108	28	234.0	332	86.7	1290	7.6	289,000
Amm.-Still Waste											2886			

trial wastes. The effect of the wastes on the results of various chemical or biochemical determinations is shown in Table I.

The ammonia-still waste used contained 2,886 p.p.m. phenol. One per cent therefore added 28.9 p.p.m. phenol to the sewage. The maximum amount of waste added was 3 per cent, equivalent to 86.7 p.p.m. phenol.

It will be noted that the increase of ammonia nitrogen was negligible, but of organic nitrogen quite considerable. The biochemical oxygen demand showed a very great increase, although not nearly so great in percentage of the original amount as the increase in the permanganate oxygen consumed. Suspended and total solids increased markedly. Alkalinity and pH increased slightly. Bacterial counts increased from 343,000 per c.c. in the sewage up to 880,000 in the 2 per cent sample, then decreased to 289,000 in the 3 per cent sample.

These analyses show clearly the very marked effect of one or two per cent of this waste on the biochemical oxygen demand of sewage. In Table II it is shown that the average B. O. D. equivalent of 1.0 p.p.m. phenol in ammonia-still wastes was 1.68 p.p.m. for the 5-day B. O. D. and 2.37 p.p.m. for the 10-day value. It happens that the

TABLE II

B. O. D. OF PHENOL WASTES

p.p.m. Biochemical Oxygen Demand per p.p.m. Phenol in Wastes

Range	p.p.m. B. O. D. per p.p.m. Phenol	
Per Cent Waste	5-day	10-day
0–1	1.90	3.11
0–2	1.56	1.82
0–3	1.58	2.19
Avg.	1.68	2.37

Oxygen Required for Complete Chemical Oxidation of Phenol

$$C_6H_5OH + 7O_2 = 6CO_2 + 3H_2O$$

$$94 : 224 = 1 : 2.38$$

latter factor is approximately equal to the chemical equivalent for the oxygen required for the complete oxidation of phenol to water and carbon dioxide. This is probably an empirical agreement inasmuch as the sulphocyanides and other organic compounds in the ammonia-still wastes also require oxygen, in addition to the phenols.

These oxygen relations indicate that the addition of even less than 2 per cent of ammonia-still wastes produces a relatively enormous increase in the biochemical oxygen demand.

The B. O. D. of the Imhoff effluent at the Calumet Treatment Works in 1927 was only 57 p.p.m.; the addition of 1.2 per cent of ammonia-still waste of the average concentration used in this test would double the B. O. D. The wastes from the Youngstown plant alone would add approximately 3 p.p.m. phenol and increase the B. O. D. by 5 p.p.m.; wastes from all three plants would add 17.0 p.p.m. phenol, increasing the B. O. D. by 28.0 p.p.m. It is apparent that before ammonia-still wastes should be permitted to be discharged into the sewers a careful study must be made of the increased cost of operation due to the presence of the wastes.

TOLERANCE OF SEWAGE FILTERS AND ACTIVATED SLUDGE FOR PHENOLIC WASTES

Sand Filters—In order to obtain information concerning the maximum amount of phenolic wastes permissible in sewage treated by biological processes, small-scale experiments were started at the Calumet Treatment Works in March, 1928. Six small intermittent sand filters were constructed in galvanized iron cans 1.13 ft. in diameter. The depth of sand was 3.0 ft., and the surface area of each 1.0 sq. ft. The first filter was used as a control and was dosed with settled sewage; the others were dosed with the same sewage containing increasing proportions of ammonia-still waste from the Wisconsin Steel Company which usually contained about 2.9 gm. phenol per liter. Each filter was dosed at the rate of 100,000 gallons per acre per day, applied in three applications per 24 hours. Composite samples of influents and effluents were analyzed twice per week. Average results for April and May, 1928, are given in Table III.

Study of the influent analyses of Table III shows the marked increase of B. O. D. when 1.0 or 2.0 per cent of waste was added—from 40 to 72 and 114 p.p.m. respectively. The addition of even 0.1 per cent waste produced a noticeable increase in the concentration of the influent.

Effluent analyses show that with 0.1 per cent waste there was no appreciable deterioration in the quality of the effluent; with 1.0 per

TABLE III

INTERMITTENT SAND FILTRATION OF SETTLED CALUMET SEWAGE PLUS INCREASING AMOUNTS OF AMMONIA-STILL WASTE

Rate of Filtration, 100,000 Gallons per Acre per 24 Hours
Results in p.p.m.

Average of Nine Analyses of Composite Samples, April and May, 1928

Sample	Nitrogen as							
	Organic + Amm.	Org.	Amm.	Nitrites + Nitrates	5-day B. O. D.	Total Solids	Oxygen Consumed	Phenol
				Control : Settled Sewage				
Influent	8.1	2.6	5.5	0.7	40.0	772	36	—
Effluent	0.9	0.5	0.4	7.0	0.7	722	16	—
				1 Part Waste : 999 Parts Sewage				
Influent	8.6	3.3	5.3	0.7	48	742	45.5	2.7
Effluent	0.9	0.5	0.4	6.6	1.0	687	11.9	0.7
				1 Part Waste : 99 Parts Sewage				
Influent	9.6	4.3	5.3	0.8	72	762	82.6	22.0
Effluent	2.3	1.1	1.2	8.1	2.7	—	18.0	1.0
				1 Part Waste : 49 Parts Sewage				
Influent	12.1	6.2	5.9	0.8	114	797	143	43.9
Effluent	10.6	2.0	8.6	2.6	2.7	—	31.0	1.1
				1 Part Waste : 9 Parts Sewage (March, Previous Series)				
Influent	34.3	22.0	12.3	1.3	330	866	635	252
Effluent	20.8	9.3	11.5	1.4	21.9	—	181	81.5
				Total Calumet Amm.-Still Wastes : Total Calumet Sewage				
Influent	10.4	4.8	5.6	0.8	69	773	49.2	17.1
Effluent	2.4	1.5	0.9	7.6	1.6	746	15.0	0.9

cent waste a satisfactory effluent was obtained, although not as low in ammonia and organic nitrogen, B. O. D., or oxygen consumed as the control, but slightly higher in nitrate. When 2.0 per cent of waste was added, the effluent was decidedly inferior, with 10.6 p.p.m. combined ammonia plus organic nitrogen, only 2.6 p.p.m. nitrite plus nitrate nitrogen, and the excessive value of 31.0 p.p.m. for oxygen consumed. This was not the satisfactory effluent that should be produced by an intermittent sand filter in good condition. The 10 per cent dilution of wastes gave a totally unsatisfactory effluent. The last filter, treating wastes from all plants in the proportions as produced, compared with Calumet sewage, gave a satisfactory effluent.

These results demonstrated that it is possible to handle influents containing up to somewhere between 25 and 35 p.p.m. phenol without serious interference with the biology of intermittent sand filtration. Later tests indicated that it might be possible to reach the higher concentration.

These tests must be considered to be more or less qualitative and not authoritative with regard to accurate determination of the rates

of filtration that may be obtained on a large scale. There is no doubt that the rate would have to be reduced as the proportion of waste increases.

Activated Sludge—We have made no experiments with phenolic wastes and activated sludge. In order to be conclusive these should be made in an operating continuous-flow plant and should extend over a period of several months. A test of a week or two is not sufficient inasmuch as the large initial bulk of activated sludge will adsorb rather large amounts of the phenolic wastes during at least the first few days, and then later lose much of its adsorptive properties. The frequently quoted tests made at Milwaukee[2] in 1920 were hardly conclusive for this reason inasmuch as they extended over only 11 days, but notwithstanding the short time of the tests, the removal of phenols was so complete as to give assurance that the concentrations treated during the earlier days of the test could be handled indefinitely. It is unfortunate that the statement has been made so frequently that 2.0 per cent ammonia-still wastes were treated, since the concentration of the wastes was quite low, averaging only 0.78 gm. per liter as compared with the 2.5 to 3.0 gm. per liter usually found in wastes from the direct process. Throughout this paper the proportions have been expressed in actual concentrations of phenol in the sewage treated.

The Milwaukee results have been re-calculated as shown in Table IV. It will be noted that approximately 14.0 p.p.m. phenol was applied most of the time, increasing to 21, 30, 48 and 61 p.p.m. during the last four days of the test. Inspection of the bacterial results

TABLE IV

EXPERIMENTAL ACTIVATED SLUDGE TREATMENT OF MIXTURES OF MILWAUKEE SEWAGE AND AMMONIA-STILL WASTE*

Waste Contained 0.78 gm. Phenol per Liter

Date 1920	Gallons per 24 Hours			Per Cent Ammonia-Still Waste is of Sewage	Phenol Treated		Bacteria in Effluent 1,000 per c.c.	
	Sewage	Ammonia Condensate Liquor	Total to Aeration Tank		Lb. per 24 Hours	Parts per Million	Control: No Waste Present	Waste Present
Aug. 31	28,080	294	28,374	1.04	1.91	8.1	—	—
Sept. 1	71,800	1,224	73,024	1.70	7.96	13.3	141	143
2	70,800	1,296	72,096	1.82	8.42	14.0	154	134
3	70,800	1,308	72,108	1.85	8.50	14.1	347	306
4	72,100	1,344	73,444	1.87	8.73	14.3	191	278
5	71,200	1,262	72,462	1.77	8.21	13.6	89	246
6	71,500	1,270	72,770	1.78	8.26	13.6	179	276
7	70,400	1,924	72,324	2.74	12.50	20.8	153	210
8	70,900	2,796	73,696	3.94	18.40	29.5	200	256
9	69,200	4,547	73,747	6.56	29.50	47.9	131	379
10	8,880	758	9,638	8.54	4.93	61.2	190	574

* Seventh Annual Report, Milwaukee Sewage Commission, Aug. 31–Sept. 10, 1920.

shows a consistently higher count in the effluent from the sewage plus wastes than from sewage alone, the increase in the former becoming rather excessive when more than 29.5 p.p.m. of phenol was present.

Further data should be available from the Milwaukee plant since it has been in full-scale operation.

Experimental tests have recently been made at Waldenburg[3] near Breslau, in Silesia, Germany. A very small-scale activated sludge plant was operated for 5 weeks at the rate of 1 liter per second. Ammonia-still wastes were added to give a concentration of 9.1 p.p.m. phenol during the 1st week, 18.2 p.p.m. the 2d week, 27.3 the 3d week, 36.4 the 4th week and 45.5 the 5th week. The results indicated complete removal at least through the 4th week (36.4 p.p.m.), and no serious impairment of the quality of the effluent until the 5th week.

The Milwaukee and Waldenburg results indicate that the activated sludge process may be able to handle up to 30 or 40 p.p.m. phenol from ammonia-still wastes without serious impairment of the quality of the effluent. The increase of air consumption or aeration period required by this concentration of wastes has not been conclusively determined.

NATURE OF OXIDATION OF PHENOLIC WASTES—AEROBIC AND ANAEROBIC CONDITIONS

The biological destruction of phenol in ammonia-still wastes appears to be accomplished by obligate aerobes. Anaerobes seem to be unable to decompose the phenol, unless very long periods of contact are permitted.

As an example of this difference an experiment was made in which approximately 30 p.p.m. phenol in ammonia-still wastes was added to Calumet sewage. The sample was divided into two equal portions. One portion was aerated in a 2-gallon bottle, the other placed in tightly stoppered quart bottles. A sample was taken from each portion each day and analyzed for phenol. The reduction of the phenol in the aerated sample between the 2d and 3d day was remarkable, the phenol decreasing from 29.9 to 2.9 p.p.m. The anaerobic sample remained completely unchanged for 4 days. Indeed, Fowler[4] has reported no change under anaerobic conditions for 14 days, while even after 8 months a large proportion of the phenol originally present (100 p.p.m.) was unaffected.

In some recent tests of sludge digestion in our main laboratory, 250 p.p.m. phenol was added to fresh sewage solids. After 138 days' digestion at room temperature the phenol content had dropped to 13.7 p.p.m., indicating considerable loss.

The relative effect of phenol on aerobes and anaerobes has

quite recently been investigated by Scott[5] at Manhattan, Kan.

He exposed pure cultures of aerobes and anaerobes, growing in liver broth, to 0.5 per cent phenol. Sub-cultures were made after intervals up to one month. None of the anaerobic spore formers were destroyed in one month either at 37° C. or room temperature. Increasing the strength to 1.0 per cent phenol had no further effect. At 5.0 per cent phenol some anaerobes were sterilized in a few days but others survived for 10 days. Aerobic spore formers withstood 0.5 per cent phenol but not higher concentrations. Non-spore-forming anaerobes withstood 0.5 per cent but all non-spore-forming aerobes were killed at this concentration.

These observations indicate that anaerobes are in general far more resistant than aerobes. This confirms the fact that large concentrations of phenol are required before sludge digestion is inhibited seriously.

Effect of Re-inoculation—The biological filters that have been used by Fowler,[6] Bach,[7] and Brown[8] for the treatment of concentrated phenolic wastes depend upon the re-circulation of from 80 to 90 per cent of the filtered effluent for dilution and inoculation of the influent

FIGURE I

EFFECT OF RE-INOCULATION ON RATE OF BIOCHEMICAL OXIDATION OF PHENOLIC WASTES

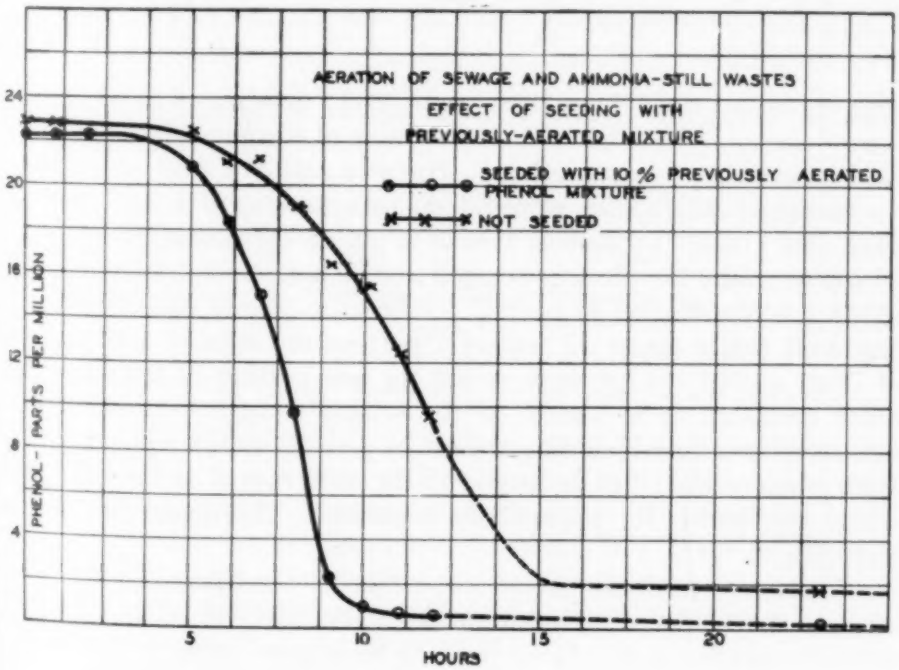
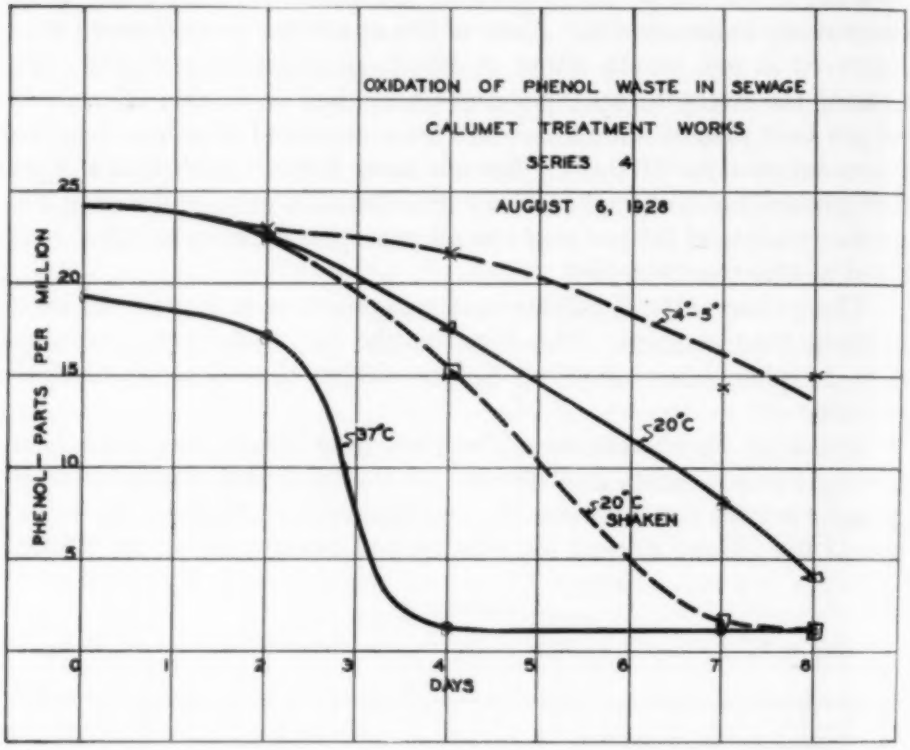


FIGURE II

EFFECT OF TEMPERATURE ON RATE OF BIOCHEMICAL OXIDATION OF PHENOLIC WASTES IN SEWAGE



with organisms which have been "activated" or adapted to the oxidation of phenol. In order to show the value of this procedure a laboratory experiment was made by E. Hurwitz and S. Grant as follows:

Ammonia-still wastes were added to a sample of settled sewage from Des Plaines Treatment Works to give a concentration of about 25 p.p.m. The sample was aerated and samples withdrawn at intervals for determination of phenol. When the phenol had almost disappeared (after about 17 hours) 1 part of the effluent and 9 parts of fresh settled sewage were mixed for one portion of the test; the other consisted of a control of the settled sewage. Ammonia-still wastes were added to both portions to give 22 or 23 p.p.m. phenol. Both portions were then aerated with the same rate of air, and samples withdrawn hourly for phenol determination. The results are shown in Figure I.

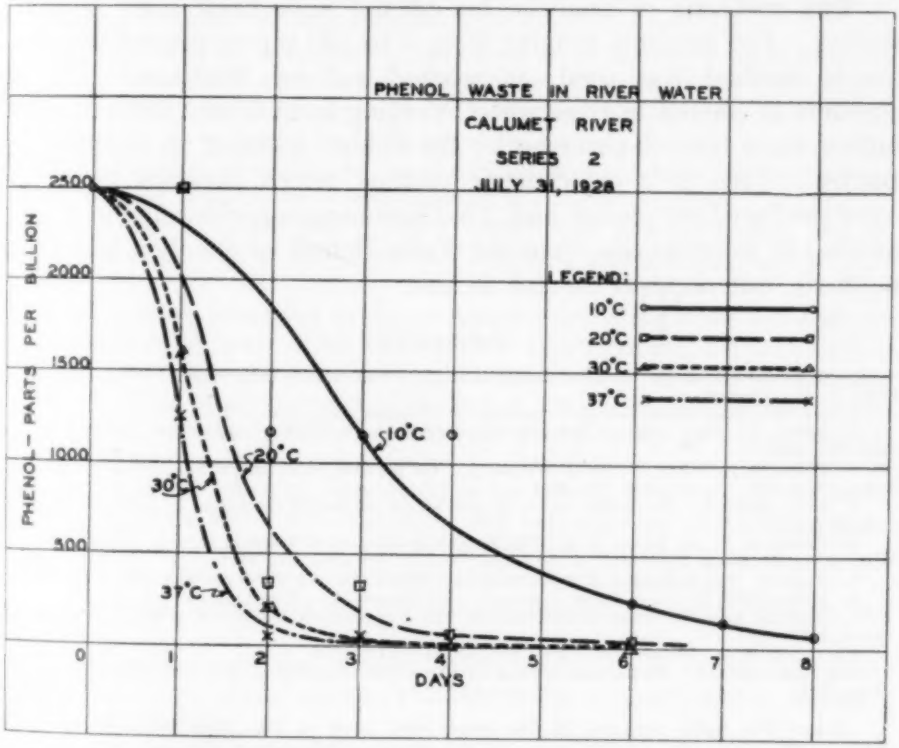
The oxidation of the phenol was markedly accelerated by the presence of the 10 per cent inoculum from the previous aeration. The time of oxidation was reduced from 15 hours to 9 hours.

EFFECT OF TEMPERATURE

It is reasonable to assume that, within the limits of temperature suitable for bacterial life, an increase of temperature will accelerate the rate of oxidation of phenolic wastes. In order to prove this assumption two temperature-rate experiments were run, one in the Calumet laboratory by J. R. Palmer and J. I. Smith, and the other in the main laboratory by G. P. Edwards. The results are shown in Figures II and III.

FIGURE III

EFFECT OF TEMPERATURE ON RATE OF BIOCHEMICAL OXIDATION OF PHENOLIC WASTES IN RIVER WATER



Calumet sewage to which 20 to 25 p.p.m. phenol in ammonia-still wastes had been added was used in the first experiment. The rate of oxidation was greatly accelerated at higher temperatures. Not enough points on the curves were determined to warrant an attempt to calculate a temperature coefficient for the reaction.

Calumet River water was used in the second experiment. The phenol content was brought up to 2,500 parts per billion (2.5 p.p.m.) by the addition of ammonia-still wastes. Samples were incubated at

10°, 20°, 30° and 37° C. The difference between the rates at 10° and 20° C. is particularly noteworthy. At 20° C. the phenol content decreased to 100 p.p.b. in 3.4 days, while at 10° C. it required 7.4 days for it to decrease to this amount.

This fact has considerable practical significance and importance. It furnishes one reason, probably the most important one, why chlorphenol tastes are more prevalent in winter than in summer. Far more phenol is oxidized in the warmer water and consequently less of it reaches intake cribs. Further development should be made of this fact in specific instances.

METHODS OF ANALYSIS

Two methods of analysis for phenol have been used in these studies. For amounts ranging from 2 to 500 p.p.m. phenol the titrimetric method was used, as worked out by Williams.[9] Minute amounts of phenol in river water, ranging from 0 to 2,500 parts per billion, have been determined by the Gibbs[10] method, as modified by Baylis.[11] This is a colorimetric method which depends upon the color produced by phenol and 2.6-dibromoquinonechloroimide. This method is more specific than the Folin-Dennis or the Fox and Gage methods, but requires careful technic.

REFERENCES

1. Bundesen, Herman N. Phenol Pollution of Public Water Supplies in the Middle West, *J. Am. Water Works A.*, 67: 240, 1928.
2. *Seventh Annual Report*, Sewage Commission of Milwaukee, Wis., Jan., 1911, p. 49.
3. Jordan, G. Tests with the Activated-Sludge Process at Waldenburg, *Gesundheits-Ingenieur*, 51: 150 (Mar. 10), 1928.
4. Fowler, G. J., Ardern, E., and Lockett, W. T. The Bacterial Purification of Ammonia Recovery Liquor, *J. Soc. Chem. Ind.*, 30: 174 (Feb. 28), 1911.
5. Scott, Joseph P. The Action of Phenol and Formol on Aerobic Organisms, *J. Infect. Dis.*, 43: 90 (July), 1928.
6. Fowler, G. J., and Holton, A. L. The Bacterial Purification of Ammonia Recovery Liquor at the Gas Works of the Manchester Corporation, *J. Soc. Chem. Ind.*, 30: 180 (Feb. 28), 1911.
7. Bach, H. The Purification of By-Products Coke Wastes, *Das Gas und Wasserfach.*, 44: 947, 1926.
8. Brown, Ralph H. *U. S. Patent 1,437,394*. The Koppers Co., Pittsburgh, Pa.
9. Williams, Ralph D. Rapid Determination of Phenol in Ammonia Liquor, *Ind. & Eng. Chem.*, 19: 530 (Apr.), 1927.
10. Gibbs, H. D. Phenol Tests, *Chem. Rev.*, 3: 291 (Oct.), 1926.
11. Baylis, John R. An Improved Method for Phenol Determinations, *J. Am. Water Works A.*, 19: 597 (May), 1928.

NOTE: The work reported in this paper was done at the main laboratory and the Calumet Treatment Works laboratory of the Sanitary District of Chicago. The writer is particularly indebted to J. R. Palmer, E. Hurwitz, G. P. Edwards and their assistants for experimental work and the analytical results.

DISCUSSION

WILLIAM A. RYAN

Sanitary Chemist, Department of Public Works, Rochester, N. Y.

THE chemical composition of ammonia-still waste from the plant of the Rochester Gas & Electric Corporation is approximately as follows:

	Grams per Liter		Grams per Liter
Phenols	2.15	Thio-cyanates	0.15
Cyanides	0.15	Ferro-cyanates	1.98
Sulphides	0.19	Thio-sulphates	7.40

The first Rochester investigation to determine the effect of ammonia-still waste upon sanitary sewage was carried on in the City Laboratory with the assistance of Mr. Shnidman, chemist of the Rochester Gas & Electric Corporation.

The results of this investigation, carried out on a laboratory scale, indicated that ammonia-still waste added to the sewage in the proportion of 1 to 1,000 effected no change in the alkalinity, pH value or biochemical oxygen demand, and had slight effect upon the number or character of the bacteria normally present in the sewage. Little or no absorption of phenol could be detected during passage through the Imhoff tanks in which the detention period was one or two hours. A slight absorption of phenol resulted after 5 hours' contact with sanitary sewage, and approximately 75 per cent of the phenol was destroyed after a contact period of 72 hours.

Before granting permission to the gas company to dispose of the still waste by discharging into the sewer rather than into the Genesee River, the City Council thought it advisable to carry on further investigations on a plant scale to ascertain the effect of waste upon the sludge in the Imhoff tanks. These tests were carried on at the Charlotte plant, which has a flow of approximately 500,000 gallons per day and a detention period of 4 hours in the Imhoff tank. For a period of 10 weeks ammonia-still waste was introduced at the rate of 1 part to 1,000 parts of sewage. Approximately 8 feet of digested and well digesting sludge was present in the sludge compartment of the tank at the time the test was begun.

Conclusions drawn from the 10 weeks of operation are as follows:

1. The sludge formed was well digested and drained, and dried well upon the sludge beds.

2. The results of chemical analyses of the treated sludge showed no radical change except in the phenol content, which gradually increased until it reached a maximum of 12 p.p.m.

3. There was an increase in the bacterial count and in the amount of gas produced. There were indications that the addition of small amounts of phenol helped rather than harmed the digestion of the sludge.

For a period of 3 weeks, following the 10 weeks' test, the ratio of still waste to raw sewage was maintained at 1 to 166. A poorly digested sludge resulted which did not dry well. The safe ratio for adding still waste to sewage appeared to lie somewhere between 1 to 1,000 and 1 to 166.

As a result of this investigation, the gas company was granted permission to discharge the wastes from the ammonia stills into the sewer. For a period of a year, 360 pounds of phenol were daily discharged into the sewer and passed through

the 10 Imhoff tanks at the Irondequoit plant without in any way affecting the digestion of the sludge. The mean daily flow at this plant is 47.7 million gallons.

During January, 1928, four tests were carried on at the Brighton Sewage Treatment plant. This plant has both Imhoff tanks and trickling filters. The results obtained were as follows:

TABLE I

	Phenol Content in p.p.m.			Per Cent Phenol Absorbed	Minimum Temperature Degrees F.
	Raw Sewage	p.p.m. Phenol Added by NH_3 Still Waste	Final Effluent		
A. Normal Sewage*	3.6		2.0	42.9	41
B. Sewage Plus Ammonia-Still Waste					
1. Ratio 1–850	4.6	2.0	3.1	31.1	41
2. Ratio 1–420	8.2	6.1	4.7	42.7	40.5
3. Ratio 1–210	11.1	8.6	7.2	35.1	41

* Average of 8 tests

It will be noted from Table I that, even at a temperature of 41° F., decomposition of phenol is possible by means of certain types of aerobic bacteria plus the oxygen present in the beds.

During the spring of 1928, an Emscher contact aerator was built in the Imhoff tank under construction at the Brighton plant. The tank and aerator were placed in service August 1, 1928. This test was carried on without the addition of ammonia-still waste. Previous tests indicated that phenolic compounds are normally found in sanitary sewage. Phenol was determined by the Folin-Dennis method.

Table II shows the average results of 12 analyses:

TABLE II

Date Collected	Phenol Content in p.p.m. Raw Sewage	Emscher Contact Aerator Effluent	Trickling Filter Effluent
9–15	2.1	2.8	1.8
9–17	3.0	2.5	1.9
9–20	2.2	1.6	1.1
9–21	2.3	2.6	1.5
9–22	2.8	3.2	1.9
9–24	3.8	3.8	2.7
9–25	2.7	2.4	1.5
9–26	2.5	2.4	1.7
9–27	2.0	2.0	1.4
9–28	2.3	2.5	1.8
9–29	1.8	1.8	1.5
10–1	2.9	2.2	1.8
Mean	2.53	2.57	1.72

Removal in Emscher Aerator—None
Removal in Trickling Filter—32 per cent
The temperature of the various samples averaged 62° F.

The results of these tests, taken in conjunction with the ones carried on in January, 1928, prove that the oxidation of phenolic wastes is not a purely chemical oxidation but one that must be accomplished through the assistance of certain types of aerobic bacteria.

Extension of Industrial Hygiene by Tuberculosis Associations in the United States*

BERNARD S. COLEMAN

Executive Secretary, Hudson County Tuberculosis League, Jersey City, N. J.

THERE are two primary reasons for including industrial work in a tuberculosis program: first, that tuberculosis is basically a problem of the working man and woman, since one out of every three or four deaths between the ages of 15 and 45 occurs from tuberculosis and the peak of our death rate is in the period of our greatest productivity; and second, that tuberculosis associations can most easily reach the tuberculous by organization of working men and women in the industries, since here we have some 40 million people in groups of various sizes who are much more easily approached than they would be as individuals."

A recent survey of the industrial hygiene activities of tuberculosis associations in the United States reveals some rather interesting facts. The majority of the larger associations include industrial hygiene in their program—from health education by health talks, motion pictures and the distribution of health literature, to the actual operation and supervision of medical departments in industrial establishments. For years attempts at industrial hygiene programs had been made, but with few exceptions the associations were handicapped by lack of funds or lack of proper personnel to carry the work to completion.

The survey which included a study of 69 state and local tuberculosis associations showed 10 conducting physical examinations in industrial plants. In some cases these examinations have been the forerunners of industrial medical departments in the plants. Six associations have developed placement bureaus to assist patients discharged from sanatoriums in securing employment. Twenty-six are endeavoring to interest employers and employes in individual health, factory sanitation, and other factors pertaining to industrial hygiene, by means of pamphlets, literature and posters; and conducting health talks and motion pictures in the plant during the noon hour. Fifteen coöperate

* Read before the Industrial Hygiene Section of the American Public Health Association at the Fifty-seventh Annual Meeting at Chicago, Ill., October 19, 1928.

TABLE I

EXTENT OF INDUSTRIAL PROGRAM OF TUBERCULOSIS ASSOCIATIONS IN THE UNITED STATES

State and Local Tuberculosis Associations	Physical Examinations of Employes	Health Education in Factories	Chest Clinics in Factories	Industrial Survey	Placement Bureau	Coöperate with Industries	Contemplate Industrial Program	Interested in Industrial Program	No Industrial Program Indicated
Alabama		x				x		x	
Arizona						x[1]			
Arkansas								x	x
California	x					x		x	
Colorado									x
Denver		x							
Connecticut								x	x
Hartford	x	x		x					
Delaware		x						x	
Georgia								x	x
Atlanta				x			x		
Illinois									x
Chicago[2]		x							
Indiana									x
Marion Co.[3]	x	x							
Iowa						x		x	
Kansas									x
Kentucky								x	x
Louisville	x	x							
Louisiana						x		x	
Maine						x			
Maryland									x
Massachusetts							x	x	x
Boston		x			x				
So. Middlesex				x		x		x	
Michigan								x	x
Wayne Co.		x			x				
Minnesota		x							
Hennepin Co.		x			x[4]				
Ramsey Co.		x			x				
St. Louis Co.		x							
Missouri								x	x
Kansas City				x			x	x	
St. Louis		x[5]							

with the industrial establishments in their communities by serving as clearing houses for information on all matters pertaining to industrial hygiene, and assist them in solving health problems which may arise. Thirty-six associations are contemplating a program of industrial hygiene; 10 have made a survey of the existing industrial medical facilities in the plants in their communities; 1 has a tuberculosis advisory service, and another operates chest clinics in factories.

That industrial health is a tuberculosis problem was forcefully brought out by E. R. Hayhurst, M.D., in 1925 in the paper which he presented before the National Tuberculosis Association:

TABLE I (*Continued*)

State and Local Tuberculosis Associations	Physical Examinations of Employes	Health Education in Factories	Chest Clinics in Factories	Industrial Survey	Placement Bureau	Coöperate with Industries	Contemplate Industrial Program	Interested in Industrial Program	No Industrial Program Indicated
Nebraska							x	x	x
Lincoln							x	x	x
Omaha							x	x	x
New Jersey[8]									
Hudson Co.	x	x		x	x	x			
Newark[3]	x	x		x	x	x			
Paterson[3]	x[9]	x		x		x			
Union Co.			x						
New York				x					
Brooklyn		x							
Buffalo		x							
New York City		x				x[6]			
Niagara		x							
Troy		x							
North Carolina									x
North Dakota									x
Ohio									x
Cincinnati		x							
Oregon		x				x	x		
Pennsylvania									x
Bethlehem	x	x				x			
Chester	x	x				x			
Erie	x	x		x		x			
Philadelphia	x[7]	x		x		x			
Scranton	x	x				x			
Rhode Island		x				x			
South Carolina						x			
South Dakota									x
Tennessee									x
Texas									x
Utah		x							
Vermont		x						x	
Virginia									x
Washington								x	x
Pierce Co.	x	x							
Wisconsin				x			x	x	

1. Assisted in engaging nurses for copper mining industry
2. Established and developed industrial service in 60 large industries in 1914
3. Nutrition classes in factories
4. Taken over by state tuberculosis association
5. Promotion of industrial medical departments in industry
6. Tuberculosis advisory service
7. Unit Plan
8. See under Newark
9. Evening clinics for labor unions

Tuberculosis exists to an unreasonable extent in the industrial group because of the ready lining up of a number of factors, such as unfit individuals for job placements, unfit jobs for individual placements, unfit surroundings for many jobs, unfit housing and recreational facilities in industrial communities, and unsupervised

sanitation and hygiene during the working hours. Industrial executives must believe in and patronize their own industrial medical services to beget the confidence of employes.

Dr. Hayhurst went further in voicing his belief that "Local tuberculosis societies might well take the leading part in stimulating the organization of medical and health supervision of industries and commercial establishments." Local, state, and county organizations are gradually awakening to their responsibilities along these lines and it is reasonable to assume that within the next decade a remarkable advance will have been made in the inclusion of industrial medical departments in plant management as a result of demonstrations conducted by the tuberculosis associations in various parts of the country.

That there was a large problem for tuberculosis associations to consider was evidenced in 1911 by the formation of the Committee on Factories of the Chicago Tuberculosis Institute, under the guidance of Dr. Theodore B. Sachs. A splendid program was developed, perhaps one of the most outstanding attempts at a comprehensive plan of industrial hygiene ever made in this country; it was carried along for 4 years and then unfortunately dropped. But in the meantime an excellent foundation had been laid for future industrial medical development in the plants in Chicago. The plan of this committee first laid emphasis on the search for tuberculosis among employes; but it soon became evident that the early detection of tuberculosis could best be accomplished through the general supervision of the employes' health, and thus it was concluded in the interest of economy that examination of employes for tuberculosis should be a part of a general industrial medical program.

Forty-one of the largest industrial concerns in Chicago and 14 social agencies coöperated with the committee; 24 conferences were held over a period of 4 years and at each meeting some important phase of industrial hygiene was discussed.

The committee's aim was:

> Toward detection and suppression of sources of infection in the working place; detection of cases of the disease in the curable stages; guidance of all employes predisposed to the disease and of those who are reëmployed after having recovered their health by sanatorium or home treatment; guidance of all employes in right living and methods of prevention.

It was considered the ultimate function of the Committee on Factories of the Chicago Tuberculosis Institute "to assist, whether by state insurance or other measures, in bringing about adequate protection for the employe, from sickness, invalidity, old age." Nor did the report fail to mention the extension and strengthening of employes' benefit associations and industrial insurance as well as the importance of "not relegating to the scrap heap" the physically handicapped.

As a result of the conferences held by the committee many of the larger firms adopted a program of medical supervision. At the beginning of the campaign there were 20,000 employes represented in the conferences; 30,000 were employed in plants where examinations were made of all suspicious cases of illness, but in none of them were examinations made of new employes. At the end of a 3-year period 187,100 were represented; 150,000 employes were in plants practicing examinations of all suspicious cases of illness; and there were 58,000 employed in plants requiring examination of all new employes. It had also been hoped to reach the smaller factories, but this was not accomplished during the 4-year period.

At about the same time that the Chicago plan was put into effect, other tuberculosis associations became interested in the fight against tuberculosis among working men's organizations in the United States, resulting in the formation of the Trades Union Section of the Buffalo Association for the Relief and Control of Tuberculosis and the Trades Union Anti-Tuberculosis Association of Newark. The latter is still active.

In a report published in 1916 by the National Association for the Study and Prevention of Tuberculosis, it was stated:

> The anti-tuberculosis society that fails to utilize the organized efforts of the workingmen is missing a real opportunity. No matter whether a community is strongly unionized or not, with a tactful approach and a proper plan, the men and women in the mills and factories can be turned into a mighty source of influence in their community, both for the good of the general public health and for the benefit of the individual personal hygiene of the workers themselves.

The report advocated periodic medical examinations to discover and control early cases of tuberculosis and other diseases and to provide for suitable employment of the convalescent worker. It directed attention to the responsibility of the tuberculosis associations in sponsoring a program of industrial hygiene.

During the last decade the most outstanding work in industrial medical development by tuberculosis societies has been that of the Philadelphia Tuberculosis and Health Council, under the leadership of Dr. Harvey Dee Brown. An industrial hygiene program has been sponsored and developed to demonstrate to industry the management and operation of the medical department in the plant proper and the advantages to be derived therefrom. The decision to include industrial hygiene in its program was inspired by Dr. Horwood's Tuberculosis Survey of Philadelphia in which he recommended that:

> . . . particular emphasis must be directed toward finding the early adult cases of tuberculosis, especially among those who are industrially employed, and to this end it is urged that . . . the anti-tuberculosis campaign be directly introduced

into the various industries, through the holding of clinics, the use of tuberculosis nurses, and the dissemination of knowledge concerning tuberculosis.

To the Philadelphia Tuberculosis and Health Council belongs the credit for showing other tuberculosis associations how the work can be done, and it is interesting to note that several are already following in the course outlined by the Council.

Beginning with noon-day talks, the distribution of posters and literature on health matters, and night clinics for industrial workers, a health examination service for employes of small plants was started. The interest of the employers was aroused and it was not very long before the service was being paid for by industry, whereas it had first been given by the Philadelphia Tuberculosis Council as a demonstration and without charge. With this development a survey was undertaken to determine how many plants in Philadelphia had medical service, and on the basis of this survey, which showed that the majority of the smaller plants had no medical service whatever, the Council undertook to present its Unit Plan for coöperative medical service among these plants.

In this plan units are made up of plants with less than 500 employes, reasonably near each other, and having a total of 1,000 employes for the unit. A full-time nurse and a part-time physician are necessary for each unit, and each plant sharing in the unit provides a clinic room at the plant. The cost for the maintenance of the unit is shared by the individual plants on a pro rata basis depending upon the number of employes. This amounts to $4.50 per employe per year. All organization and administration expenses, that is, cost of record forms, establishment of medical department, and organization of the work, are borne by the Health Council. Excellent results have been attained.

In 1927 the Council was successful in developing health work in 20 plants, in 4 of which the work was taken over and continued entirely by the plants. Industrial medical activity was supervised in 15 plants to the extent that the work can be taken over by the plants themselves whenever they are ready to do so. In Philadelphia 6,000 employes are now in plants in which there is medical supervision as a result of the efforts of the Council.

A report of the Council states that in 1927 there were 18,682 visits to plant dispensaries maintained under the Unit Plan. Of these 10,871 were for minor accidents and 7,811 for various slight accidents.

The Unit Plan includes a monthly health poster service, health classes among employes, advice on personal health problems, sanitary surveys and monthly sanitary inspection of the plant.

The Philadelphia experiment has led to the development of industrial hygiene programs in the activities of the tuberculosis associations of Paterson, Newark and Jersey City, N. J.; Erie, Chester, Bethlehem and Scranton, Pa.; Louisville, Ky.; and Indianapolis, Ind.

In Paterson, N. J., several plants have already taken over the work demonstrated by the Paterson Tuberculosis and Health League. Nutrition classes for underweight employes, in addition to the health examination service, and night clinics for labor unions have been established.

For the past 3 years the New Jersey Tuberculosis League has maintained an industrial health service intended to demonstrate to industry the importance of guarding the health of the worker, the value of periodic health examinations and the manner in which a program of medical supervision in the plant can be carried out systematically and efficiently. During this period 3,396 examinations were made in 30 plants in Newark. Sixty-four cases of tuberculosis were detected, of whom 27 were later admitted to sanatoriums, only to be returned to their jobs as arrested cases at the end of their stay. The examination service in Newark was intended to serve as the nucleus for the development of the Unit Plan.

The Hudson County (N. J.) Tuberculosis League has only recently started its health service for industry, and is patterning its program according to the Philadelphia plan, with slight modifications. A survey of industrial medical facilities in the county has been made and it shows a general lack of direct medical supervision in the industries, especially in those employing less than 1,000 employes. Here, as also in Newark, Paterson and Philadelphia, a demonstration of the physical examination of the employe will be made before the Unit Plan in part or in its entirety is offered to the plants. Great stress is being laid upon the physical examination of the applicant prior to placement; periodic examinations of all employes every year, except where otherwise indicated; "fitting the individual to the job"; the care and cleanliness of wash rooms, locker rooms, rest rooms and toilets; and proper illumination and ventilation in the plant. An effort is being made in the follow-up of all employes examined to have them correct their physical defects. In case of inability to pay for medical treatment the employes are directed to the clinics in the county. The follow-up work is considered one of the strongest points of the entire program, for by interesting the individual in his own physical condition it is hoped to further interest him in the betterment of conditions at the plant from the standpoint of hygiene and sanitation.

The Hudson County Tuberculosis League, in conjunction with the

Hudson County Safety Council, is planning a series of lectures on industrial hygiene to plant executives and foremen. These will include the health of the worker and sanitation of the plant. Matters pertaining to compensation for industrial accidents and diseases, and the medico-legal aspects of the latter will be discussed.

In Erie, Pa., a survey has been made, the demonstration of examinations is being carried out, and it is planned to develop the Unit Plan. The Erie Anti-Tuberculosis Society believes that under proper supervision, "it should be one of the most important services that a tuberculosis association can do for an industrial community." The interest and coöperation of the Erie Manufacturers' Association and the Erie Safety Council have been secured.

The New York Tuberculosis and Health Association maintains a Tuberculosis Advisory Service for the purpose of assisting industrial physicians and personnel directors with problems pertaining to the early diagnosis of tuberculosis and the placement of patients in different stages of the disease. The service was organized "at the suggestion of some of the well known industrial physicians who now make use of it and consider it part of their respective organizations, and is designed to assist in the care of such patients as are reluctant to consult a specialist because of the cost, yet whose position is such that they are unwilling to accept free care." Some of the largest industrial organizations in New York City are subscribers to this service.

In 1926 an industrial survey of Hartford, Conn., was made by the Hartford Tuberculosis and Public Health Society. It was conducted in 39 factories employing 25 or more persons each and covered a total number of 18,875 employes. The majority of the plants were members of the Hartford Manufacturers and Employers Association. As a result of the survey it was concluded that "the development of medical service is more practicable in the larger plants than in those employing fewer numbers, but that a joint plan of medical service could be adopted in a group of smaller plants."

The Marion County (Ind.) Tuberculosis Association has "extended its health efforts into Indianapolis industries with the hope of interesting employers in increased efficiency in industry through the systematic health supervision of employes," and has conducted physical examination campaigns and developed adult nutrition classes.

A county industrial health program has been developed by the Tuberculosis Society of Detroit and Wayne County, Mich., but it has not included the development of an intensive medical service in factories. The society acts as a clearing house for the tuberculosis problems arising in factories; it has an extensive program of health edu-

cation for industry; and maintains an employment service for arrested cases of tuberculosis.

In carrying on the fight against tuberculosis in industry many problems are presented pertaining to the health of the individual and of the public in general, and the physical examination clinic, sponsored by the majority of tuberculosis associations in the United States, can become the nucleus of an extensive industrial medical department.

CONCLUSION

This paper has purposely omitted a discussion of placement services, rehabilitation work, and the various types of educational work performed by the tuberculosis associations. It has aimed rather to summarize in a general way the extent to which industrial hygiene activities are being included in their programs. Considering the interest and work undertaken during the past few years it is reasonable to assume that definite progress, although slow, is being made in the extension of industrial hygiene by tuberculosis associations in the United States.

Many of the tuberculosis organizations studied in the survey are making an attempt to interest industrial executives in the advantages that may be derived from industrial medical service in the plant, and to date there have been many instances of success as a result of these endeavors.

BIBLIOGRAPHY

1. Chicago Tuberculosis Institute. Medical Examination of Employes, *Bull. Chicago Tuberculosis Inst.*, Series 3, No. 10, June, 1915.
2. Chicago Tuberculosis Institute, Committee on Factories. Examination of Employes for Tuberculosis.
3. Sawyer, W. A. Relation of an Industrial Medical Department to a Community Health Program, *J. A. M. A.*, 89: 17 (Oct. 22), 1927.
4. Brown, H. D.; Marsh, M.; Funkhauser, E. K.; Gray, J.; and Granger, G. F. Industrial Health Number, *Bull. Natl. Tuberc. Assn.*, 12: 3 (Mar.), 1926.
5. Horwood, M. P. A Tuberculosis Survey of Philadelphia, *A. J. P. H.*, 14: 1 and 2 (Jan., Feb.), 1924.
6. Sachs, T. B. The Campaign in Chicago for Medical Examinations of Employes, *Transactions National Tuberculosis Association*, 1914.
7. Hartford Tuberculosis and Health Society. *Industrial Survey.*
8. New York Tuberculosis and Health Association. How the Tuberculosis Advisory Service Can Help You, *Spec. Bull.*
9. Coleman, B. S. Health Service for Industry, *J. Outdoor Life*, 24: 1 (Jan.), 1927.
10. Dinan, E. A. Health Examinations for Factory Workers, *Bull. Penn. Tuberc. Soc.*, 9: 4 (Apr.), 1928. Helping the Small Plant with a Health Service Program.
11. Winter, J. K. *National Safety News*, 18: 3 (Sept.), 1928.
12. Funkhauser, E. K. Philadelphia Establishes Medical Service in Industry, *Nation's Health*, 6: 11 (Nov.), 1924.
13. Watson, C. H. Selling Industrial Medical Department Activities, *Nation's Health*, 9: 1 (Jan.), 1927.
14. Philadelphia Health Council. Medical Service in Industrial Plants in Philadelphia, *Memo.*, 2: 1 (Aug.), 1924; 2: 1 (Feb.), 1925; 6: 1 (Mar.), 1928.
15. National Tuberculosis Association. Working Men's Organization in Local Anti-Tuberculosis Campaigns, *Pamphlet 105.*
16. Hayhurst, E. R. Why Industrial Health is a Tuberculosis Problem, *Trans. Natl. Tuberc. Assn.*, 1925.
17. Jacobs, P. P. Personal Communication.

A Series of Typhoid Fever Cases Infected per Rectum*

C. R. HERVEY, M. D., FELLOW A. P. H. A.

District State Health Officer, Oswego, N. Y.

DURING January and February, 1928, 13 cases of typhoid fever occurred in a group of surgical patients in a general hospital of 118 beds.

Transmission of the disease is attributed to the practice of using the same Harris drip apparatus interchangeably between patients without sterilization. The Harris drip apparatus consists of a container for fluid, and a rubber rectal tube. Unlike the Murphy drip, the Harris drip container is placed at the side of the patient at the level of the abdomen, and the fluid allowed to flow under very low pressure. As there are no check valves the containers are subject to gross contamination when a reverse flow occurs during vomiting, straining, or the advance of gas or feces in the bowel. At the time of the outbreak it had been the procedure to sterilize the tubing, but the containers were rinsed in tap water only.

The outbreak was explosive, or at least semi-explosive in character, all the cases occurring in a period of a little over 3 weeks. The age incidence ranged from 8 to 79 years, though only 3 of the cases were under 25 years of age.

With one exception the cases were confined to the second floor of the hospital, consisting of 17 rooms and a small ward of 4 beds. Four of the rooms contained 2 beds each, which were occupied at the time in question. In 9 of the rooms on this floor, and in 1 room on the first floor, typhoid cases occurred.

The onset of the first case was probably January 24, but the presence of typhoid was not suspected until February 5, when the third case in the series died, and an autopsy showed typhoid lesions. Following this, typhoid was demonstrated in all cases by laboratory tests of blood, urine, and stools.

All the cases had been on the Harris drip and, with one exception, occurred after surgical operations. The exception was a patient with carcinoma, who received the drip as a sustaining measure.

---

* Read at a Special Session on Epidemiology of the American Public Health Association at the Fifty-seventh Annual Meeting at Chicago, Ill., October 18, 1928.

The drip containers were not suspected until February 13, by which time 9 cases had developed. They were sterilized on this date. The onset of the last case was 6 days later, on February 19.

No one in the hospital developed typhoid who had not received the drip from the apparatus on the second floor.

Incubation periods were, as nearly as could be determined, as follows: 4 days in 3 cases, 6 days in 2, 7 days in 3, 8 days in 2, and 9 days in 3. The average period was between 6 and 7 days.

This is about one-half to one-third the usual incubation period in typhoid by infection by mouth, though incubation periods as short as 2 and 3 days have been ascribed to cases so infected.

Figure I shows the temperature curves from the first drip administrations to the rises indicative of the onsets. These were all major operative cases, and postoperative temperatures frequently occurred. But the rises of temperature on the dates of ascribed onset were usually so sharp, and the symptoms of the patients were so severe, that they seem quite certainly to indicate a superimposed infection. No infection of a surgical nature could be found and it seems fair to ascribe them to the typhoid fever. The onsets were usually initiated by chills, and the temperature rose almost to maximum height within the first 24 hours in the majority of cases.

Contact between cases other than by the drip medium; contact with a carrier or carriers among nurses, or other employes; infection outside the hospital, excepting in case 1; and food or water infection; seem to be satisfactorily excluded by the following considerations:

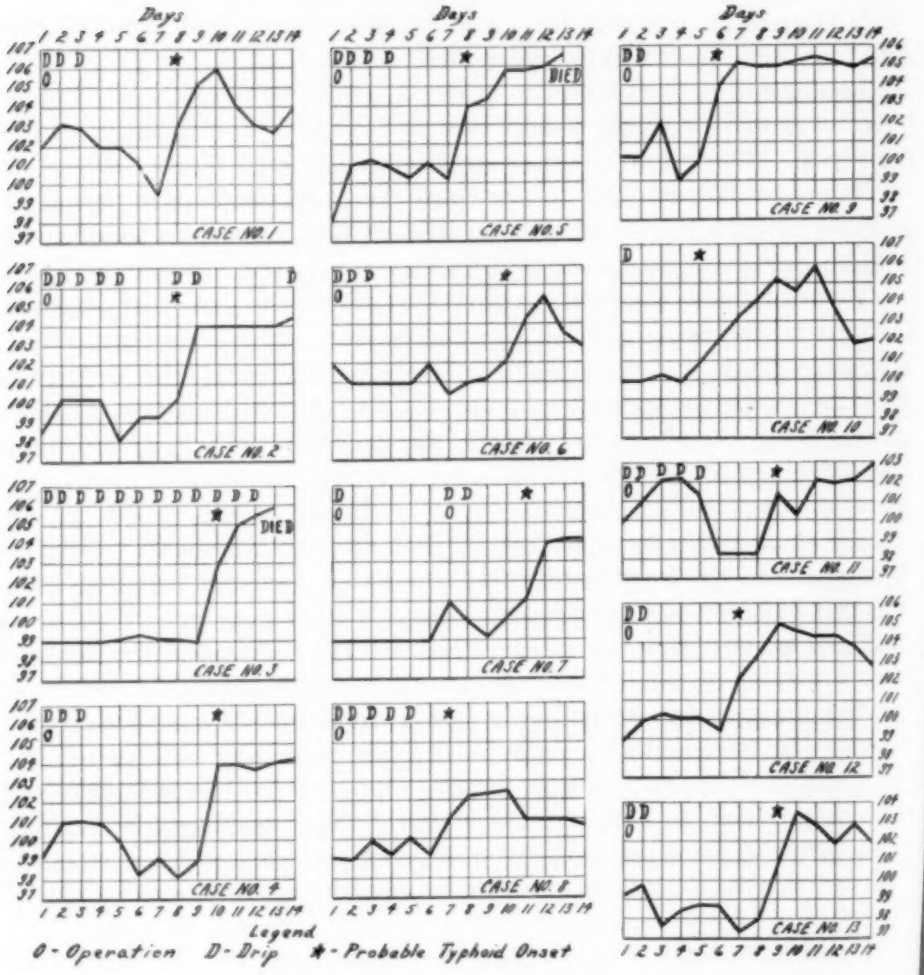
Contact between Typhoid Cases—Opportunity for contact infection might seem to have existed in the 4 rooms having 2 beds each. Two of these were occupied by male, and the other 2 by female patients. We will consider the rooms severally as numbered, 1, 2, 3, and 4.

Room 1—A medical case occupied this room with case 1 from January 10 to January 28; that is, during the incubation period, and for 4 days after the onset. He did not have the drip, and did not contract typhoid.

Case 8 also occupied this room while case 1 was in the height of his fever, from February 5 to February 9. He was administered the drip on each of these days, and developed typhoid on February 12, 7 days after the first drip. This patient was 79 years of age and was operated upon immediately after admission for ruptured appendix. The chance of infection by mouth cannot be certainly ruled out, but when the age and the diet of such a case are considered, the chance seems very remote.

Room 2—Case 4 occupied this room for 4 days after receiving the drip, but was removed therefrom on February 2, 5 days preceding her attack. Case 6 was here with case 4 only over the night of February 1. Case 6 had the drip on February 2, 3 and 4. Her attack occurred on February 12. Case 13 occupied room

FIGURE I—Excerpts from Temperature Charts of Typhoid Patients, Showing Relation of Incubation Periods to Harris Drip



2 with case 6 from February 10 to 14, 2 days before and 2 days after the onset of case 6. She had the drip on February 11 and 12. Her attack occurred 8 days after the first administration.

Room 3—A medical case occupied room 3 with case 11, during his incubation period, and for the first day of his attack. He did not have a drip and was not infected.

Room 4—A medical case occupied room 4 with case 2 during the incubation period, and for 8 days after the onset of attack. She did not have the drip, and did not contract typhoid.

Only 3 of the 13 cases occupied rooms with cases having earlier onsets. Thus, of the 6 room contacts, the 3 without drips did not contract typhoid; whereas, the 3 having the drips did. There seems little, therefore, on which to base a theory of

infection by contact other than the drip. Furthermore, 4 medical cases in an adjacent ward, and 4 in contiguous private rooms, under conditions apparently identical, but who did not have the drip, did not contract typhoid.

A Carrier among Nurses or Other Employes—A search was made for a carrier among nurses and employes who might have infected the drip containers, or the food supply. Blood, urine and fecal specimens from each nurse in the institution, and from all inside employes, were found negative. The patients affected were served by 18 special nurses, who did not interchange services between rooms.

Infection Outside the Hospital—Eight of the 13 cases came to the hospital from widely separated communities in which no known typhoid had existed for months, and in some instances for years. Five were from the city, where typhoid occasionally occurs but where no known typhoid had occurred for several weeks. There is no reason to suspect any excepting the first case of being in the incubation period on entrance. It would be absurd to postulate that each of these individuals contracted typhoid outside, and came together to develop it on the second floor of this hospital.

Food and Water—Food for the patients and employes was prepared in the general kitchen in the basement of the main building. For private room patients it was served on dishes in the central diet kitchen, taken to the various floors, and distributed by the nurses to their charges. Food for the ward patients was taken in bulk to the several ward diet kitchens where it was placed on dishes, and distributed. The same food supply served the whole institution, the only difference being in the method of distribution.

Milk used was from a pasteurized supply, from a dairy furnishing 34 per cent of the milk of the city. It was conveyed to the hospital in 25-gallon cans and served to the floors in pitchers and jugs. Water was from the city supply, which was chlorinated, filtered, and under competent supervision at all times.

The absence of typhoid at this time in the city, and among other patients in the institution, would exempt both the milk and water from suspicion.

A persistent attempt was made to discover the identity of any individual, other than case 1, who might have infected the first container. In this pursuit specimens of urine, blood and feces of all patients, with one exception, on the second floor, who had received the drip within 25 days preceding the onset of the first case, were examined and found negative. The exception was a person who had left the locality without known address, but the hospital records show that this patient had not had typhoid fever.

Case 11 furnishes additional evidence against the Harris drip container. This patient was taken to a private room on the first floor after a cholecystectomy. A drip apparatus, taken from case 5, was used on February 7, 8, 9 and 10. The last use of the apparatus by case 5 was on February 5. This case was then in the 4th day of his 7-day incubation period. Nine days later the onset occurred in case 11.

The significant sequence of events determining this outbreak seems to us to be as follows: Between January 10, the date of admission of the patient first to develop typhoid, and until they were sterilized, 7 apparatuses were used on this floor in the treatment of 20 cases. It was a common procedure to retain the apparatus in a room until drips were discontinued, but as no rule existed to the contrary, they were sometimes interchanged between rooms, or taken to the floor washroom, tubes boiled, containers rinsed, and left, unless the patient was to continue the treatment.

Figure II shows the date of admission of every patient receiving the Harris drip between December 30 and February 13. It also shows

FIGURE II—Patients in Surgical Group, Arranged according to Date of Admission

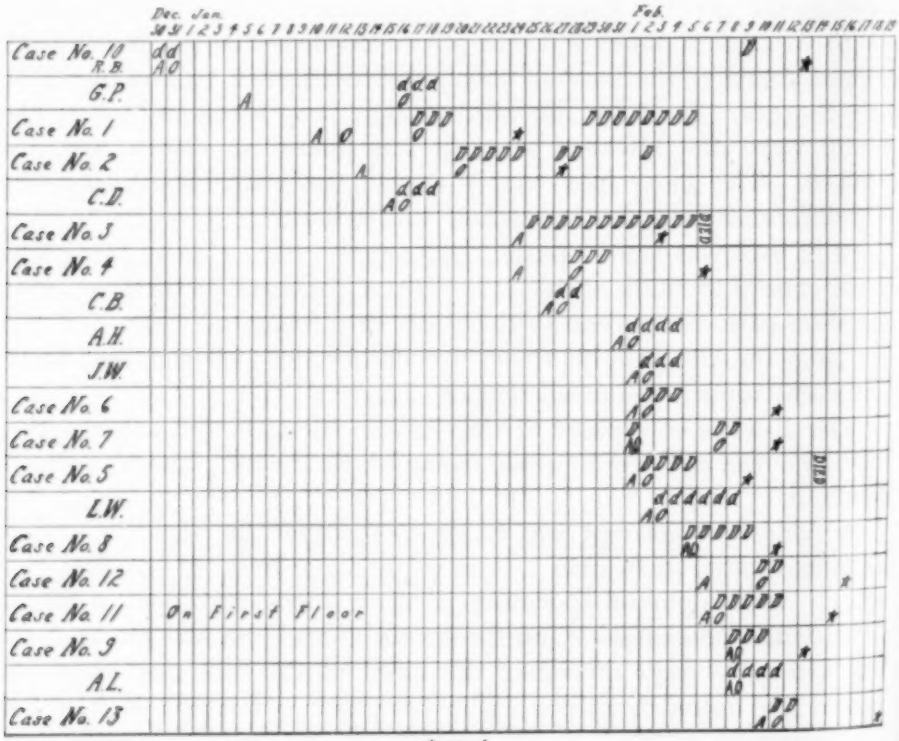
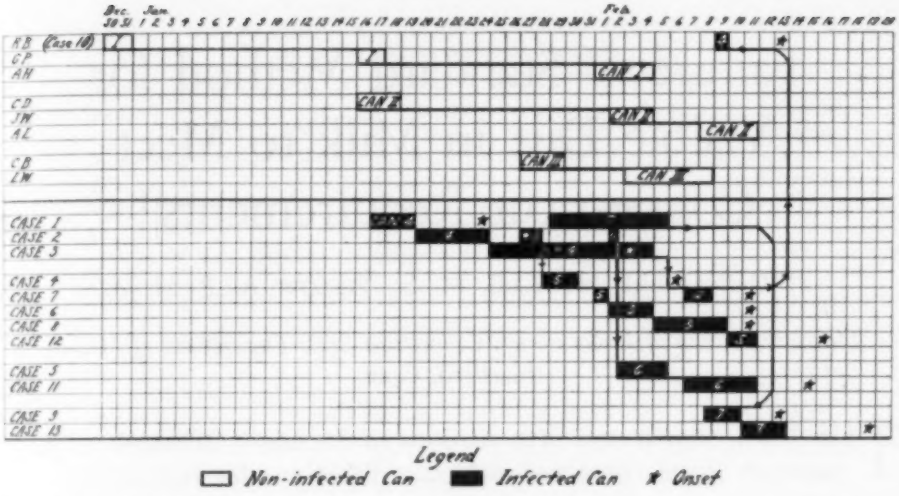


FIGURE III—Sequence of Events



the date of operation, the dates on which the drip was used and the dates of onset in those who contracted typhoid.

Drips which did not apparently result in infection are designated by a small "d," those which did, by a large "D." From this chart, we have been able to deduce a sequence of events graphically shown in Figure III, which would account for all of the infections having come from case 1, and at the same time account for the escape of the 7 unaffected individuals.

SUMMARY AND CONCLUSION

Thirteen cases of typhoid fever occurring in a hospital of 118 beds were all among a group of 20 surgical patients, to each of whom a rectal drip had been administered.

Gross pollution of drip apparatus occurred regularly when in use.

After use the containers were rinsed but not sterilized.

Other routes of infection have been excluded beyond reasonable doubt.

Case 1 developed typhoid on the 14th day after admission to the hospital and it is not unreasonable to postulate that he was infected before admission. No other sources of infection were found on laboratory examinations of the excreta and blood of other patients, attendants, etc.

In the instance of case 11, an apparatus known to have been taken directly from case 5 was used and typhoid developed 8 days later.

A hypothetical sequence in the exchange of apparatus, compatible with known facts, has been shown, which would account for the entire epidemic.

Failure of Standard Method for Visible Dirt in Milk to Meet Connecticut Requirements*

FRIEND LEE MICKLE, M. S., FELLOW A. P. H. A.

Director, Bureau of Laboratories, Connecticut State Department of Health, Hartford, Conn.

THE third, fourth and fifth editions of *Standard Methods of Milk Analysis*[1] have contained not only directions for making the test for visible dirt in milk essentially as previously described by Schroeder,[2] but have included as well the standards for grading and reporting suggested by that author. The Connecticut modification of the test, published by Mickle,[3, 4] was adopted by the approved milk laboratories of that state because the technic in *Standard Methods* was too ambiguously worded to result in uniform findings in the various laboratories. The modification has found favor with laboratory workers, but its use has demonstrated the need in Connecticut for new standards for grading all milk samples. Particularly have the present standards been shown to be unadapted for use on milk as delivered to the consumer. This has resulted because milk that would have been accepted as clean when the present standards were originally developed would today be considered dirty milk with the present methods of clarification.

The results of 6 months' experience in the use of the Connecticut modification are given in Tables I and II to call attention that, although the standards are easily used in the laboratory, the results reveal a need for changing the value of the descriptive terms used jointly in the *Standard Methods* and the Connecticut modification so that, for example, milk containing as much visible sediment as represented by 1.25 mg. per pint will no longer be classed as clean milk.

Table I summarizes the results of 6 months' testing of all samples of bottled and bulk milk received at the Bureau of Laboratories of the Connecticut State Department of Health. Out of a total of 2,331 samples tested, 2,193 (94.1 per cent) were graded as showing less

* Read at a Joint Session of the Laboratory and the Food, Drugs and Nutrition Sections of the American Public Health Association at the Fifty-seventh Annual Meeting at Chicago, Ill., October 15, 1928.

TABLE I

RESULTS FROM 6 MONTHS' USE OF CONNECTICUT MODIFICATION OF MILK SEDIMENT TEST BY STATE DEPARTMENT OF HEALTH

Milligrams per Pint	Percentages[1]	Samples Tested	Percentages[2]	Cleanliness Ratings[2]
0.00	94.1	541	61.5	Clean and Fairly Clean
0.25		886		
0.50		505	21.5	Acceptable
0.75		157	14.5	Dirty
1.00		104		
1.25	5.9	79		
2.50		47	2.5	Very Dirty
3.75		10		
5.00		2		
Total	100	2,331	100	

1. Of all samples of bottled and bulk milk tested, 94.1 per cent fell inside limits of Connecticut standard; 5.9 per cent fell outside and were graded according to standard method.
2. The right hand two columns show approximately how samples would have been graded by author's suggested "Cleanliness Ratings," with the new values suggested by the author for the descriptive terms.

than 1.25 mg. of dirt per pt. All these were graded as "clean" under the standard method but by the procedure suggested in this paper only 23.5 per cent of the total would have been grouped as "clean" while 38.0 per cent would have fallen in the class of "fairly clean," 21.5 per cent in the class of "acceptable," and the balance would have been considered as "dirty." The latter grouping far better meets the need of the enforcement official.

In Table II is presented a summary of the results secured by the New Haven City Health Department* over a period of nearly 6 months. These examinations were all made on pint samples. The director of that laboratory has informed the writer that he has found the method in the fifth edition of *Standard Methods* "cannot be applied to the general run of samples of New Haven milk unless every sample is called clean, but that the method as modified by the Milk Laboratory Workers Association of Connecticut and adopted by that organization for all Connecticut approved laboratories, at a meeting

* Results obtained in the Bureau of Laboratories of the New Haven Health Department were furnished by P. E. Bransfield, Director. They have been arranged in tabular form to make them conform with Table I and to illustrate how they would have been graded by the author's suggested classification.

TABLE II

RESULTS FROM NEARLY 6 MONTHS' USE OF CONNECTICUT MODIFICATION OF MILK SEDIMENT TEST BY NEW HAVEN DEPARTMENT OF HEALTH

Milligrams per Pint	Percentages[1]	Samples Tested	Percentages[2]	Cleanliness Ratings[2]
0.00	99.8	526	97.2	Clean and Fairly Clean
0.25		96		
0.50		12	1.8	Acceptable
0.75		5	0.8	Dirty
1.00				
1.25	0.2			
2.50			0.2	Very Dirty
3.75		1*		
5.00				
Total	100	640	100	

1. All the samples included in this table were pint samples of bottled milk. Of these, 99.8 per cent fell within limits of Connecticut standard; 0.2 per cent fell outside and were graded according to standard method.

2. The right hand two columns show approximately how samples would have been graded by author's suggested "Cleanliness Ratings," with the new values suggested by the author for the descriptive terms.

* "The indications are that the dirt in this sample of milk came from a dirty bottle, which for some reason escaped being washed, rather than that the dirt was in the milk itself. In my opinion, this one sample should be considered an accident."—Excerpt from letter from P. E. Bransfield, who furnished these data.

held in Hartford on January 9, 1928, is quite satisfactory for milk sold in New Haven," and adds that from the results obtained "it would seem that the A. P. H. A. Standards could be applied only to can or bulk milk in New Haven."

Connecticut officials charged with enforcing regulatory measures have been outspoken against the laboratories, following the standard method, having to class as "clean," milk that in this section of the country is considered dirty. Much of the value of the test as used in Connecticut has been educational in the way of elimination of sediment from milk as sold, by repeatedly impressing on the producer the desirability of marketing a milk a little cleaner than his competitor's. Granted that many times a "cleaned," rather than a "clean" milk undoubtedly reaches the housewife, the use of the test has surely been a factor, coupled with intelligent inspection and modern competition, in enormously reducing the visible dirt in market milk. To grade as "clean" samples showing 1.00, or as "fairly clean" samples showing 1.25 mg. of sediment per pt., if from milk as offered in trade today, would seem to be inconsistent with modern health education and

propaganda. For the purposes of the enforcement official it does not remedy the matter greatly to state on the report: "Where bottled milk is examined it should not show even 1.25 mg. of sediment per pt." if the sample is graded as "clean" or "fairly clean." Connecticut milk can scarcely be so much cleaner than that in other states that similar conditions do not prevail elsewhere. The undesirability of one state adopting a standard at variance with that in use elsewhere is evident in view of the frequency of milk surveys comparing results secured over broad areas.

As a result of his experience with the test, the author suggests the following changes in the standard method, and in the Connecticut modification as well, wholly in a spirit of constructive criticism with full realization that the committees on standard methods have never recommended the test for grading market milk samples at city and state laboratories in milk control work. On the other hand, it is believed the test should be as extensively used for that purpose as for grading milk at milk receiving stations and, accordingly, that it should be modified to more satisfactorily meet that need although it should not fail to meet as well the requirements for the rapid testing necessary at the receiving plant.

SUGGESTED CHANGES

1. *Size of Sample*—Pint samples should be continued as standard. Where larger samples either of bottled or bulk milk are received they should be thoroughly mixed and only 1 pint filtered. Where less than 1 pint of sample is examined the disc obtained should be graded directly against the photographic standard described below and the numerical result proportioned to a pint basis and then, but not until then, the accompanying descriptive term applied. This is desirable because, otherwise, if samples of various sizes are reported on one report, the results may be misleading. The size of sample should always be stated on the report when it is less than a pint. To state the size without making the calculation does not suffice because the result is expressed on the basis of the number of milligrams in a pint.

2. *Specifications for Testing Equipment*—It is rather desirable that the same type of tester be used in different laboratories, particularly as the discs furnished with the different testers may vary decidedly in thickness, texture and density. Specifications for a satisfactory testing device and for the cotton pads might well be incorporated in the method.

3. *Photographic Standard*—In Connecticut experience there has been far greater disagreement when individual laboratories attempted to prepare standard gauges by adding dirt to milk according to published directions than when a central agency prepared such a standard, photographed it, and distributed photographs to the laboratories to use as standards in grading the sediment obtained from filtering milk samples. It is very necessary that care be taken in eliminating shadows when making the negative of the photographic standard if prints are to be uniform. The prints distributed to laboratories to use as standards should be printed in large

numbers at a time on a photographic paper found by trial to be adapted to the purpose, and the light used and length of exposure should be such that conditions can be closely reproduced later. Several photographs purposely printed for different lengths of time were found to give comparable results in grading, however, when the precaution had been taken to eliminate shadows in making the original negative.

Grading should in no case be done against a reproduction from a printer's cut such as has been reproduced in *Standard Methods*. It is customary and almost a necessity in some laboratories where a large amount of grading is done to protect the photographic standard by framing it under glass. The author has not been able to see any objection to one laboratory using a framed and another an unframed photograph but the desirability of this practice might be considered.

The use of carbon of suitable density and proper size of particles, as has been suggested by Harding[5] (1928) and others, may be an improvement later but is not considered necessary for a usable photographic standard. It is understood that a committee of the International Association of Dairy and Milk Inspectors is investigating the possibilities of different grades of carbon as this is written. The suggestion has recently been made to the author that other substances, for example, manganese dioxide (pyrolusite), might be even better adapted to the purpose and it is hoped this material can be given a trial in the near future.

In preparing the standard discs for photographing, a "standard" dirt should be secured in quantity by the committee. A mixture of stable dirt from several sources has proved satisfactory for the purpose providing its density is increased slightly, if necessary, by the addition of a small amount of finely ground sand or similar material before the weighings are made. The stable dirt most comparable with that obtained from market milk in Connecticut was that which passed a 100-mesh sieve. The size of the sand particles should be slightly smaller than that of the dirt particles to render them unnoticeable.

4. *Discs Not to be Kept on File*—The entire disc should preferably in all cases be returned to the dairyman, health or dairy official or milk inspector with the report, and preferably attached to it. The record of the "sediment score" and "cleanliness rating" kept at the laboratory should be sufficient for record purposes in any case. In some instances it is difficult to cut discs into two portions showing equal amounts of dirt.

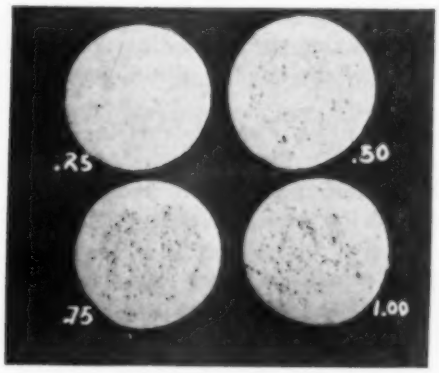


FIGURE I—CONNECTICUT SEDIMENT STANDARDS ADOPTED AT CONFERENCE OF CONNECTICUT APPROVED LABORATORY WORKERS ON JANUARY 9, 1928.

5. *Grading Large Sediment Particles*—No attempt should be made to grade as sediment any hair, piece of hay or straw or large particle of dirt. The finer dirt on the disc should be compared with the standard and reported as usual and then the report should state that sediment disc showed this material in addition.

6. *Additional Standard Gauges*—A large proportion of the specimens of milk examined in laboratories maintained by the cities and the state in Connecticut for control purposes are samples of bottled milk just as sold to consumers or of milk sampled from cans as delivered to schools, institutions or eating places. Figures given below demonstrate that very few of

these show as much sediment as that on the disc representing 1.00 mg. per pt. Since that is true, additional standards (Figure I) are recommended for use on milk as sold to the consumer, representing, respectively, 0.25, 0.50, 0.75 and 1.00 mg. per pt. Otherwise nearly all the samples examined will be placed in the one grade of "clean" and the work of making the test nullified. That these amounts have proved suitable for the purpose is shown in Tables I and II and in the discussion of the tabulated results.

7. *Descriptive Terms in Standard Methods Should be Changed*—The gauges pictured in the fifth edition of *Standard Methods* appear to be very usable at the farm and the receiving plant but the descriptive terms are not very apt for use on bottled milk and should be changed. Attention is called to the undesirability of having two sets of standards if that can be avoided, for many times on one report there may be tabulated a set of samples with some representing bottled or market milk and others representing samples collected at the farm or the milk plant. The author sees that occur almost daily. It would appear to be so unfortunate to have to mark one sediment disc attached to the report as "slightly dirty" and a dirtier one "clean," because two differing standards were being used, that the writer suggests the same gradings for all milk samples. It would seem desirable that standards be continued as a part of the printed method to discourage the upgrowth of a variety of standards in other ways and through other organizations.

8. *Terms for Reporting*—The term "milligrams per pint" is not strictly accurate since only a visual comparison of the obtained sediment is made with another "standard" sediment without taking into account the differences in density. That is the case whether or not the actual gauges or photographic standards are used for grading. Furthermore the term is cumbersome and not easily understood by many enforcement officials and dairymen. It is suggested the term "milligrams per pint" be abandoned in favor of an arbitrary standard in which the milligrams or fraction of a milligram of dirt in each instance would be multiplied by 100 to give for the eight standard gauges the corresponding eight whole numbers: 0, 25, 50, 75, 100, 125, 250 and 500, to be known as a "sediment score." Milk samples would then be graded as in Table III.

TABLE III

CHART FOR GRADING VISIBLE SEDIMENT IN MILK ACCORDING TO AUTHOR'S SUGGESTED METHOD

Terms Not to be Reported	Terms to be Reported	
Milligrams per Pint	Sediment Score	Cleanliness Ratings
.00–0.12	0	Clean
.13–0.37	25	Fairly Clean
.38–0.62	50	Acceptable
.63–0.87	75	Slightly Dirty
.88–1.12	100	Dirty
1.13–1.77	125	Very Dirty
1.78–3.75	250	Very Dirty
3.76–5.00+	500	Very Dirty

It is suggested that no "sediment score" be reported within closer limits than the eight units listed.

Results of any milk sediment test for visible dirt should always be reported both in terms of the "sediment score" and also by one of the descriptive terms for

"cleanliness rating." It is possible that other descriptive terms than "clean" and "dirty" may be found preferable to those terms.

SUMMARY

The standard method for visible dirt in milk and the modification adopted for Connecticut approved health laboratories and recently published by the author are discussed. Results justify the modification for Connecticut market milk but suggest new terms for reporting. A universally adopted photographic standard distributed by the Committee on Standard Methods is urged in place of standards made by individual laboratories. Because the method aims at determining amount and not color of dirt a photographic standard should be applicable in any locality regardless of color of local soil. Connecticut experience demonstrates that satisfactory photographic standards can be prepared from discs with weighed amounts of stable dirt of proper specific gravity if shadows are eliminated in photographing. A standard carbon in place of stable dirt is not necessary, although its adoption later might improve the photographic standards. The term "milligrams per pint" is not readily understandable and is inaccurate; so photographic discs should be assigned arbitrary numerical values to be reported always together with corresponding descriptive terms.

REFERENCES

1. American Public Health Association. *Standard Methods of Milk Analysis*, 3d ed., 1921; 4th ed., 1923; 5th ed., 1927.
2. Schroeder, M. C. Dirt Sediment Testing—A Factor in Obtaining Clean Milk, *A. J. P. H.*, 4, 1: 50 (Jan.), 1914.
3. Mickle, Friend Lee. Modified Sediment Test for Visible Dirt Adopted in Connecticut, *A. J. P. H.*, 18, 7: 926 (July), 1928.
4. Mickle, Friend Lee. Connecticut Standard Test for Dirt in Milk, *Health Bull.*, Conn. State Dept. of Health, 42: 27, 1928.
5. Harding, H. A. Sediment Standards in Connecticut, *Bull.*, Dairy Research Division of Mathews Industries, Inc., Detroit, Mich., 6: 205.

Women and Children in Industry

THE medical inspectors of factories in the duchy of Baden, Germany, have completed an investigation in an industrial and a rural district to determine the effect of factory and of farm work on the health of women workers and of children. Most of the industrial workers were employed in textile factories. In the course of the study the investigators interviewed women workers and their employers.

In both the industrial and the rural regions the average mortality rate for 1920–1926 for women of wage earning ages was higher than the rate for men of the same ages, apparently on account of the excessive fatigue caused by the double duty of wage earning and housekeeping. The factory work itself did not seem to have a bad effect on the health of the women workers.—*Reichsarbeitsblatt*, Berlin. Nos. 17 and 20, 1928.

Effect of Calmette's BCG Vaccine on Experimental Animals*

MERRILL J. KING, M. D., AND WILLIAM H. PARK, M. D.,
FELLOW A. P. H. A.

Hegeman Memorial Research Laboratory, Metropolitan Life Insurance Company Sanatorium, Mount McGregor, N. Y.; and the Bureau of Laboratories, Department of Health, New York, N. Y.

MANY methods of prophylactic immunization against tuberculosis have been recommended and attempted by such men as Koch, Pasteur, Baldwin, Theobald Smith, Trudeau, Pearson and Gilliland, Von Behring and others. During the past few years considerable publicity has been given the BCG vaccine of Calmette and some difference of opinion has been reflected in the literature regarding the efficacy of this vaccine, and especially regarding the danger that may be connected with its use in infants.

The *Bacillus Calmette-Guérin,* which is the so-called BCG, was isolated from a heifer in 1908 by Calmette and his associates. They determined it to be the bovine type of tubercle bacillus and to possess moderate virulence for guinea pigs, rabbits and cattle. Continuous cultivation over a period of years on glycerinated ox-bile potato medium reduced the virulence of the organism so that it will now produce only small localized tubercles which heal within a few months. They further state that it is able to produce skin hypersensitiveness and immunity against infection with virulent tubercle bacilli.

Calmette first recommended that new-born infants be fed the BCG, and it was so administered in 1921 at the Maternity Hospital in Paris. Since that time nearly 100,000 infants have been given this prophylactic vaccination, but only a relatively small number of these have been recorded in statistical studies, and the reports of Calmette have been attacked as being statistically incorrect. Calmette is convinced of the innocuousness of the vaccine and of its ability to immunize against tuberculosis, and many workers have found the bacillus to be non-virulent for small laboratory animals. Others have been able to

* Read before the Laboratory Section of the American Public Health Association at the Fifty-seventh Annual Meeting at Chicago, Ill., October 18, 1928.

produce progressive disease, and Nobel[1] and Gerlach[2] were able to carry the lesion successively from guinea pig to guinea pig. Petroff and Branch[3] have produced progressive tuberculosis and death in guinea pigs and have dissociated the original Calmette culture into two strains—the "R" type which always produces some tubercles which in time heal, and the "S" type which invariably produces progressive disease terminating in death, in the guinea pig.

The BCG culture used in these studies was obtained directly from Dr. Calmette. The organism has been continuously cultivated on ox-bile glycerinated potato medium and we have endeavored to follow Calmette's instructions implicitly in this regard. We have found no difficulty in getting profuse growths. The colonies, which usually appear in about two weeks, are clear-cut and moist, but they soon dry and pile up rapidly and culturally resemble Petroff's "R" type, and in being difficult to emulsify have further agreed with his description. All animals which have died or been killed have had postmortem examinations and, in the majority of cases, reinoculations have been made. We have deliberately kept the groups of vaccinated animals small in order that we might test as many different transplants of the culture as possible. In these preliminary experiments the primary interest was in assuring ourselves of the innocuousness of the BCG for guinea pigs, monkeys and calves. The experiments are being continued and will be reported in more detail at a later time.

The experiments have been arranged in three main groups, according to the method of administration of the BCG: (1) oral, (2) subcutaneous and (3) intraperitoneal.

VACCINATION BY MOUTH

Guinea Pigs—Three groups of week-old guinea pigs were fed the vaccine as follows:

Guinea Pigs	50 mg. each		
6	3 feedings	Killed 25 weeks	Negative
6	3 feedings	Killed 21 weeks	Negative
12	7 feedings	Killed 27 weeks	Negative

Calves—Seven new-born calves were fed with the following results:

Calves	50 mg. each		
5	5 feedings	Killed 51 weeks	Negative
1	5 feedings	Killed 5 weeks	Negative
1	5 feedings	Living 2½ years	Negative tuberculin

Monkeys—Ten monkeys receiving from 3 to 12 feedings each, gave more interesting results (see top of next page).

The 4 monkeys which had tuberculous lesions had only small, discrete non-caseous tubercles of the lymph nodes. Two monkeys also had similar lesions in the spleen. Although infrequent acid-fast rods were present in the tubercles of 3 of

Monkeys	50 mg. each			
2	3 feedings	Killed	8 weeks	Negative
1	6 feedings	Died	8 weeks	Negative
1	9 feedings	Died	8 weeks	Negative
1	11 feedings	Killed	8 weeks	Negative
1	6 feedings	Died	13 months	Tubercles spleen, mesenteric nodes
1	11 feedings	Killed	8 weeks	Tubercles of mesenteric nodes, spleen
1	12 feedings	Killed	13 months	Tubercles of mesenteric nodes
1	12 feedings	Killed	23 months	Tubercles of mesenteric nodes
1	6 feedings	Living	2½ years	

these, triturates of the viscera and nodes failed to produce lesions when injected into normal guinea pigs.

The results of the feeding experiments show that we were unable to find evidence of the absorption of the BCG in 24 guinea pigs and 7 calves, whereas 4 of the 9 monkeys had small discrete tubercles in their mesenteric nodes.

ORAL VACCINATION FOLLOWED BY INFECTION WITH VIRULENT BACILLI

Guinea Pigs—Three groups of week-old guinea pigs are listed below. These animals were given 3 to 7 feedings of 50 mg. each.

Guinea Pigs	Interval	Infecting Dose	Method		Result
3	9 weeks	0.02 mg. bovine	Subcut.	Killed 21 weeks	Generalized tuberculosis
4	13 weeks	0.10 mg. bovine	Subcut.	Killed 13 weeks	Generalized tuberculosis
12	13 weeks	0.10 mg. human	Subcut.	Killed 8 weeks	Generalized tuberculosis

Eleven non-vaccinated controls gave the same tuberculous picture as the vaccinated animals.

Calves—Eight new-born calves, each receiving 5 feedings of 50 mg. each, and 7 non-vaccinated controls were included in this series.

Calves	Interval	Infecting Dose	Method		Result
2	30 weeks	10.0 mg. bovine	Subcut.	Killed 10 weeks	Localized cold abscess
				Control 10 weeks	Localized cold abscess
1	16 weeks	5.0 mg. bovine	Subcut.	Killed 36 weeks	Negative
				Control 10 weeks	Localized cold abscess
1	16 weeks	5.0 mg. bovine	Subcut.	Killed 36 weeks	Tuberculous node
				Control 10 weeks	Localized cold abscess
1	16 weeks	5.0 mg. bovine	Subcut.	Killed 10 weeks	Localized cold abscess
				Control 10 weeks	Localized cold abscess
1	30 weeks	1.0 mg. bovine	Vein	Killed 10 weeks	Bronchial, mediastinal nodes
				Control 10 weeks	Bronchial, mediastinal nodes
1	30 weeks	0.1 mg. bovine	Vein	Killed 10 weeks	Negative
				Control 10 weeks	Bronchial, mediastinal nodes
1	22 weeks	20.0 mg. bovine	Fed 2X	Killed 20 weeks	Negative
				Control 21 weeks	Negative

Two animals in this series failed to develop tuberculous lesions while their corresponding controls became infected. The attempt to infect by feeding was unsuccessful, neither control nor vaccinated calf reacting after two doses of 10 mg. each of bovine bacilli.

Monkey—One monkey was given 4 feedings of 50 mg. each, and 16 weeks after the last feeding it was injected subcutaneously with 0.3 c.c. of a very dilute suspension of human tubercle bacilli, and when killed 56 days later because of an open sinus at the site of inoculation it had, in addition to the local abscess, about

a dozen pea-sized caseous tubercles in the liver and spleen. Two control monkeys receiving the same dose of virulent organisms died on the 57th and 62d days respectively with massive tuberculosis of the viscera.

SUBCUTANEOUS VACCINATION

Guinea Pigs—Four groups totalling 22 guinea pigs were inoculated subcutaneously as follows:

Guinea Pigs			Result
1	3 mg.	Killed 13 months	Negative
1	3 mg.	Killed 18 months	Histological tubercles in lymph nodes, infrequent acid-fast rods
1	5 mg.	Killed 3 months	Histological tubercles in lymph nodes, infrequent acid-fast rods
1	5 mg.	Killed 3 months	Histological tubercles in lymph nodes, infrequent acid-fast rods
1	25 mg.	Killed 10 months	Negative
1	50 mg.	Killed 14 months	Negative
1	50 mg.	Living 14 months	
2	25 mg.	Living 14 months	
1	25 mg.	Killed 1 month	Histological tubercles in lymph nodes, acid-fast rods
1	25 mg.	Died 9 months	Secondary infection; histological tubercles, acid-fast rods
1	25 mg.	Died 9 months	Secondary infection; histological tubercles spleen
9	25 mg.	Living 15 weeks	
1	25 mg.	Died 10 weeks	Secondary infection; tubercles nodes, spleen, liver

The guinea pig in the 4th group which died of secondary infection showed an extensive tuberculosis of the mesenteric nodes, spleen and liver. The inguinal node at the site of inoculation was caseous. Acid-fast bacilli were present in the pus and in the tubercles of the mesenteric nodes and liver. This guinea pig is the only animal in our experience which has developed an extensive progressive tuberculosis after vaccination alone. The other animals in the group seem normal. One may consider that the single guinea pig which developed progressive tuberculosis is an instance of individual susceptibility. It does not seem likely that there were sufficient "S" type colonies in the small portion of vaccine inoculated to cause progressive tuberculosis in one guinea pig while the other guinea pigs in the same group have shown no evidence of progressive tuberculosis.

Two guinea pigs injected with the material from the caseous node and spleen of the tuberculous animal described above were negative to tuberculin 30 days later. One of these, killed at 32 days, showed no evidence of tuberculosis. The other is apparently normal, has gained in weight, and gives a negative tuberculin 90 days after the inoculation.

Monkeys—Eight monkeys were injected with 50 mg. each of vaccine:

Monkeys			Result
1	50 mg.	Died 37 weeks	Several pinpoint tubercles in spleen; acid-fast rods
1	50 mg.	Died 35 weeks	One macroscopic and several histological tubercles in lung and spleen; acid-fast rods
1	50 mg.	Killed 93 weeks	Negative
1	50 mg.	Killed 58 weeks	Histological tubercle in lung; acid-fast rods
4	50 mg.	Living 60 weeks	

Here again guinea pigs were injected with triturates of the nodes and spleens of the autopsied monkeys and failed to become infected.

Calves—Four groups, making a total of 46 calves, were injected, 50 mg. in each animal. Twenty-nine of these are living 9 months; 11, 5 months; and 5, 3 months after vaccinations. The 46th animal, a bull calf, gave a positive tuberculin 10 weeks after injection of the BCG, but the reaction became doubtful in the 42d week and was negative at 72 and again at 90 weeks. After the second negative tuberculin, the bull was placed on a farm to be used for breeding. The tuberculin test was repeated on the 120th week and it was found that the bull and several cows in the herd had developed positive tuberculins. The bull was slaughtered in the 124th week and was found to have tubercles in the bronchial and mediastinal nodes and in the lungs. It seems probable that this is a case of re-infection rather than evidence of the acquisition of virulence by the BCG on long residence in the animal. Calmette advises annual re-vaccination, which was not done in the case of this bull. Unfortunately it was impossible for us to be present at the autopsy; nor could we obtain the viscera in order that we might culture the bacilli in the lesions and ascertain if they were virulent.

In summarizing the subcutaneous series it should be pointed out that we were able to produce tubercles at the site of injection of the BCG in many of our animals. These lesions caseated in several instances. The production of minute tubercles in the adjacent lymph nodes occurred in the majority of the animals inoculated. Spleen involvement occurred in 4 animals with a further extension to the liver in one of these. In another animal, small tubercles were produced in the lung. One guinea pig which died 10 weeks after injection had extensive progressive tuberculosis apparently due to the BCG. Saline emulsions of the caseous material and tubercles of this guinea pig contained many acid-fast rods but failed to infect two normal guinea pigs on subinoculation. In fact, in no instance did saline emulsions and triturates of the BCG lesions of vaccinated animals produce tubercles when subinoculated into normal animals, although all of the material so inoculated contained acid-fast rods. Forty-five of the 46 calves are still living. We believe that at least 34 of these developed tubercles, since they became allergic within 12 weeks after vaccination, and 27 of 29 had lost this skin-hypersensitiveness by the 32d week.

SUBCUTANEOUS VACCINATION FOLLOWED BY INFECTION WITH VIRULENT BACILLI

Guinea Pigs—Three groups of vaccinated guinea pigs were subsequently infected by the subcutaneous method with the following results:

Guinea Pigs	BCG	Interval	Infecting Dose			Result
1	6 mg.	20 weeks	0.02 mg. bovine	Killed	2¼ years	Negative
1	6 mg.	20 weeks	0.10 mg. bovine	Killed	39 weeks	Negative
3	Controls		0.02 mg. bovine	Killed	21 weeks	Generalized tuberculosis
3	Controls		0.10 mg. bovine	Killed	52 weeks	Generalized tuberculosis
1	Control		0.10 mg. bovine	Died	52 weeks	Generalized tuberculosis

PLATE I

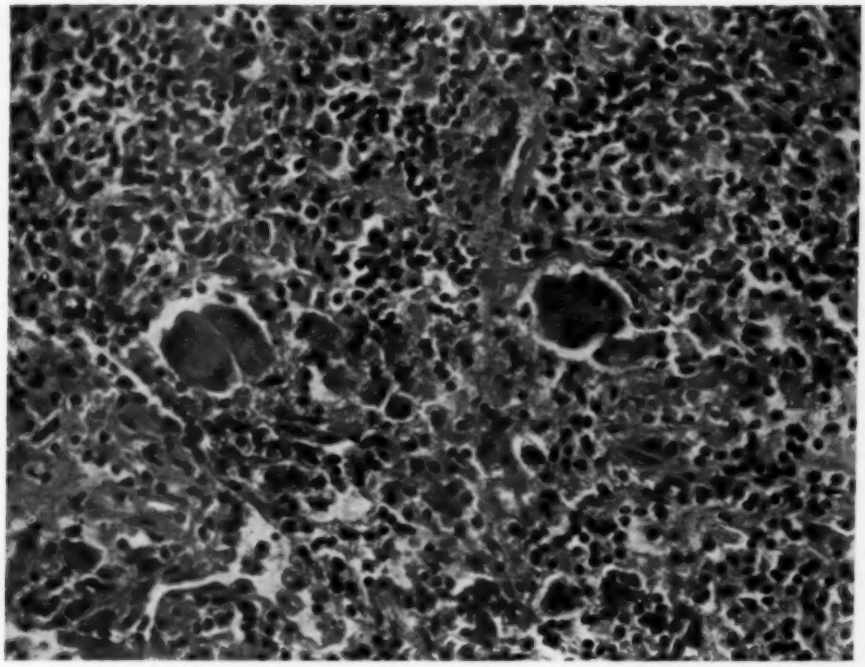


FIGURE I—Tubercle in lung of monkey vaccinated subcutaneously 58 weeks previously with 50 mg. of BCG. × 410.

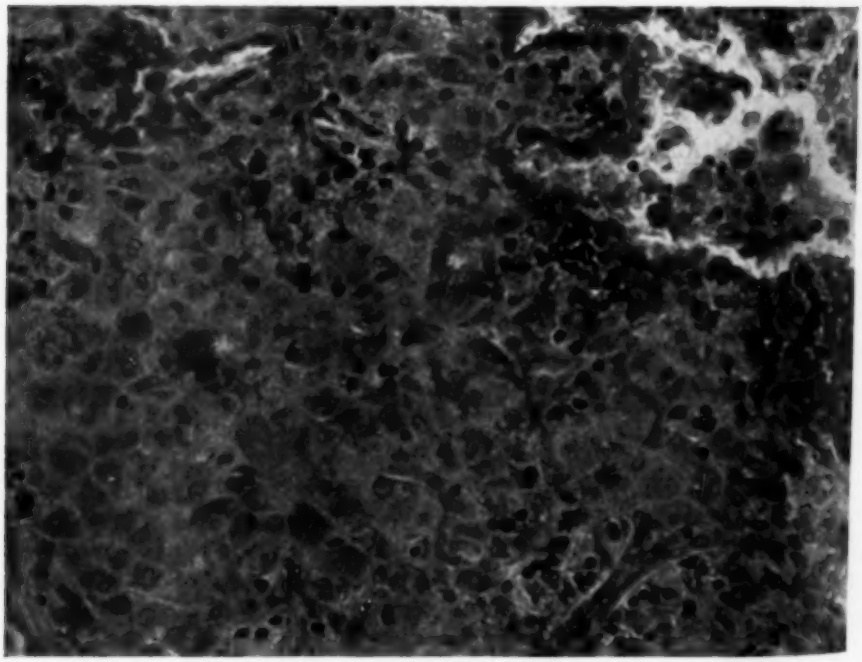


FIGURE II—Tubercle in lung of monkey vaccinated subcutaneously 35 weeks previously with 50 mg. of BCG. × 410.

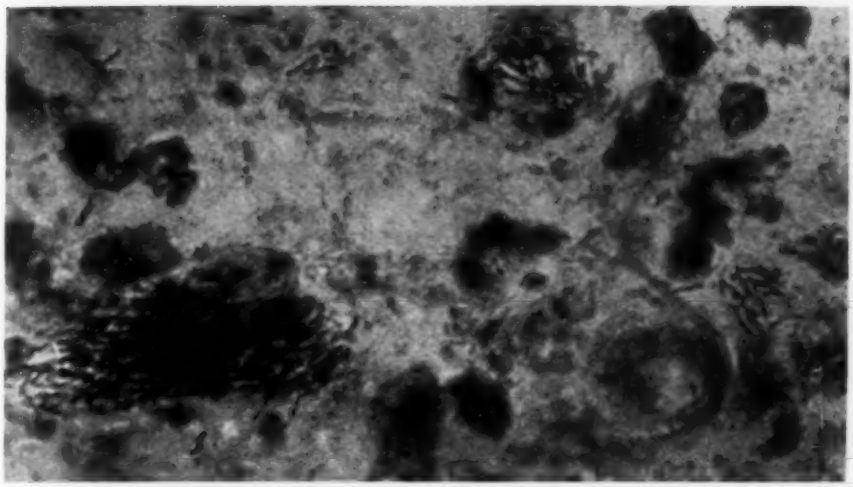


FIGURE III—Caseous material from inguinal lymph node of guinea pig injected 10 weeks previously with 25 mg. of BCG into the groin. On subinoculation this material failed to infect normal guinea pigs. Ziehl-Neelson stain. × 1,810.

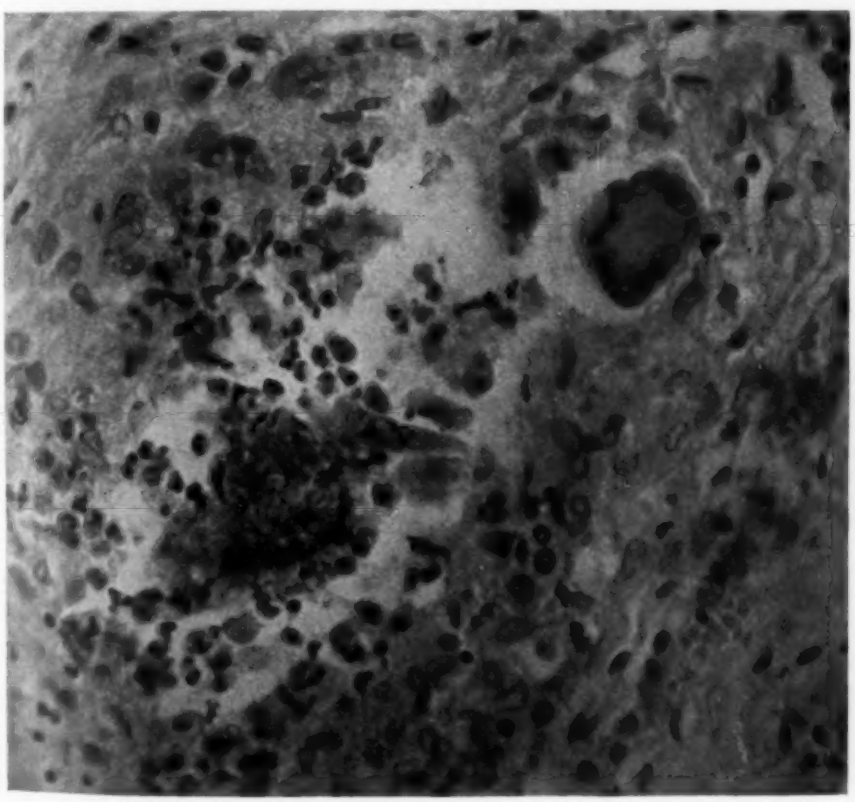


FIGURE IV—Lymph node of guinea pig vaccinated subcutaneously 10 weeks previously with 25 mg. of BCG. Ziehl-Neelson stain. × 640. Acid-fast rods were demonstrated in all lesions illustrated.

Guinea Pigs	BCG	Interval	Infecting Dose			Result
1	25 mg.	43 weeks	0.02 mg. bovine	Killed	8 months	Few discrete tubercles spleen, liver, lungs
1	25 mg.	43 weeks	0.02 mg. bovine	Killed	8 months	Few discrete tubercles spleen, liver, lungs
1	Control		0.02 mg. bovine	Died	7 months	Massive tuberculosis
2	Controls		0.02 mg. bovine	Killed	8 months	Massive tuberculosis
1	Control		0.02 mg. bovine	Died	9 months	Massive tuberculosis
1	50 mg.	4 months	0.3 c.c. human	Killed	33 weeks	Tubercles nodes, spleen
1	50 mg.	4 months	0.3 c.c. human	Died	45 weeks	Tubercles nodes, spleen
1	50 mg.	4 months	0.4 c.c. human	Killed	8 weeks	Tubercles nodes, spleen
1	25 mg.	4 months	0.5 c.c. human	Killed	23 weeks	Tubercles nodes, spleen, liver, lung
3	Controls		0.3 c.c. human	Died Av.	18 weeks	Generalized tuberculosis

There seems to be some evidence of protection in the vaccinated guinea pigs, for 2 failed to develop tuberculosis, while their controls developed extensive generalized tuberculosis. The remaining 6 guinea pigs developed tuberculosis, but much less extensively than their non-vaccinated controls.

Monkeys—Only 2 monkeys and 2 controls infected by the subcutaneous method are included in this series:

Monkeys	BCG	Interval	Infecting Dose			Result
1	50 mg.	16 weeks	0.3 c.c. human	Killed	57 days	Caseous nodes, tubercles in viscera
1	50 mg.	16 weeks	0.5 c.c. human	Killed	117 days	Caseous nodes, tubercles in viscera
1	Control		0.3 c.c. human	Died	57 days	Generalized tuberculosis
1	Control		0.5 c.c. human	Died	62 days	Generalized tuberculosis

The 2 vaccinated monkeys likewise developed more localized infection than their controls, which died in a shorter time.

Calves—The immunity experiments in calves are composed of 16 animals which are subdivided into 5 groups.

Calves	BCG	Interval in Weeks	Dose Bovine	Method	Killed in Weeks	Result
1	50 mg.	16	5.0 mg.	Subcut.	11	Cold abscess
1	50 mg.	16	5.0 mg.	Subcut.	40	Negative
1	50 mg.	16	5.0 mg.	Subcut.	40	Few tubercles adjacent lymph node
1	Control		5.0 mg.	Subcut.	11	Cold abscess
1	Control		5.0 mg.	Subcut.	13	Tubercles adjacent node
1	Control		2.0 mg.	Subcut.	13	Tubercles adjacent node
1	50 mg.	31	10.0 mg.	Subcut.	11	Cold abscess
1	50 mg.	31	10.0 mg.	Subcut.	11	Cold abscess
1	Control		10.0 mg.	Subcut.	11	Extensive tuberculous nodes
1	50 mg.	31	1.0 mg.	Vein	11	Tubercles bronchial, mediastinal nodes
1	50 mg.	31	0.1 mg.	Vein	11	Negative
1	75 mg.	8	1.0 mg.	Vein	21	Tubercles bronchial, mediastinal nodes
1	75 mg.	8	0.1 mg.	Vein	21	Negative
1	Control		0.01 mg.	Vein	12	Tubercles broncho-mediastinal, mesenteric nodes
2	Controls		0.1 mg.	Vein	12	Tubercles broncho-mediastinal, mesenteric nodes
2	Controls		1.0 mg.	Vein	12	Tubercles broncho-mediastinal, mesenteric nodes

Calves	BCG	Interval in Weeks	Dose Bovine	Method	Killed in Weeks	Result
1	50 mg.	22	0.01 mg.	Subcut.	44	Negative
1	50 mg.	22	0.01 mg.	Subcut.	44	Negative
1	50 mg.	66	0.01 mg.	Subcut.	22	Negative
1	50 mg.	66	0.10 mg.	Subcut.	22	Negative
1	Control		0.05 mg.	Subcut.	12	Negative
1	Control		0.02 mg.	Subcut.	25	Negative
1	Control		0.01 mg.	Subcut.	34	Negative
1	Control		0.10 mg.	Subcut.	34	Negative
1	50 mg.	21	100 mg.	Fed 2X	20	Negative
1	50 mg.	21	250 mg.	Fed 5X	20	Negative
1	50 mg.	21	500 mg.	Fed 5X	20	Negative
2	Controls		300 mg.	Fed 3X	20	Negative
2	Controls		20 mg.	Fed 2X	20	Negative

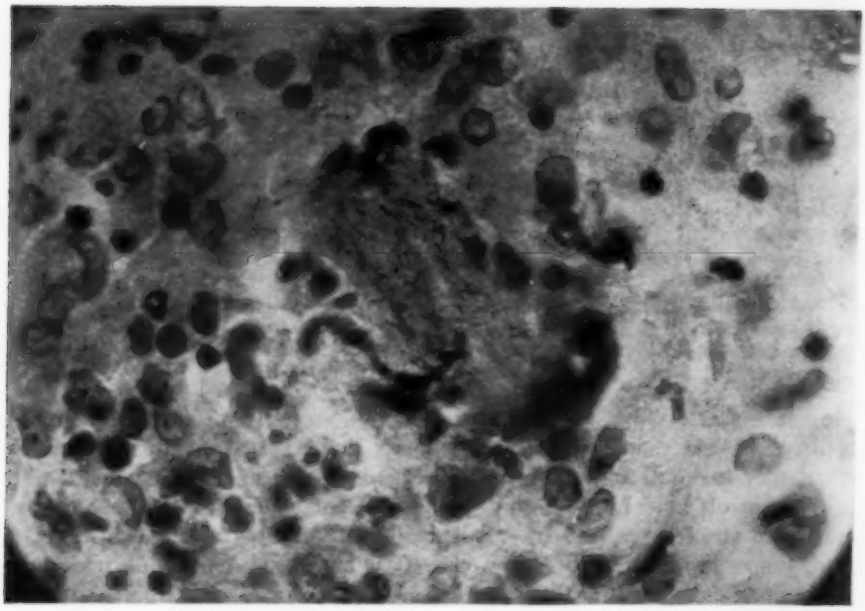
In the first 2 groups we again found some evidence of immunity in the vaccinated calves. In 3 instances the lesion was limited to cold abscess formation, with no lesion in 1 calf and lesions in the regional lymph node in but 1 calf, whereas in the controls lesions were found in the adjacent nodes in every case except 1, where a cold abscess was present. In the 3d group 0.1 mg. intravenously did not produce lesions, while this dose, as well as 0.01 mg., produced lymph node lesions in the control calves. In both instances 1.0 mg. intravenously in control calves produced lesions in the mesenteric nodes as well as in the broncho-mediastinal nodes, whereas in the vaccinated calves 1.0 mg. produced lesions in only the broncho-mediastinal groups. Complete immunity was apparently produced in the feeding series and in the series where doses of 0.1 mg. and 0.01 mg. were injected subcutaneously, but unfortunately tuberculosis was not produced in the control calves in either of these series.

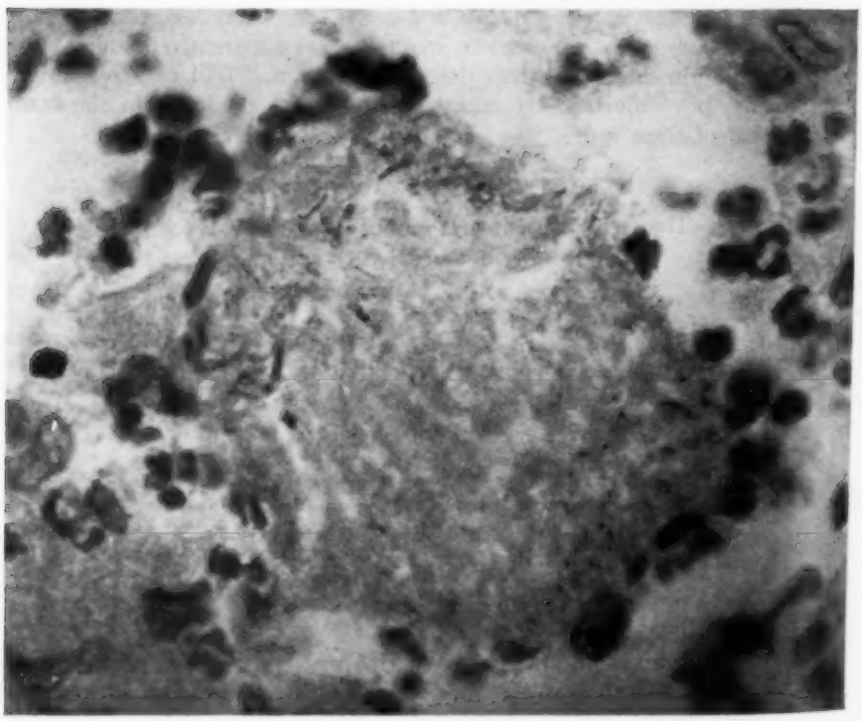
INTRAPERITONEAL VACCINATION

Guinea Pigs—The series consists of 2 groups of 6 animals each:

Guinea Pigs			
3	25 mg.		Living 30 weeks
1	25 mg.		Killed 29 weeks; tubercle spleen
1	25 mg.		Killed 29 weeks; caseous node, small tubercle spleen, liver
1	50 mg.		Living 30 weeks
		Re-vaccination	
1	25 mg.	8 weeks 25 mg. subcut.	Living 20 weeks
1	25 mg.	8 weeks 25 mg. subcut.	Died 13 weeks; secondary infection; tubercles mesenteric nodes
1	25 mg.	8 weeks 25 mg. subcut.	Killed 19 weeks; tubercles omentum
1	25 mg.	8 weeks 50 mg. subcut.	Living 20 weeks
1	25 mg.	8 weeks 50 mg. subcut.	Died 16 weeks; secondary infection
1	25 mg.	8 weeks 50 mg. subcut.	Living 20 weeks

In this series 2 guinea pigs died at 13 and 16 weeks after a second vaccination, the vaccinations being only 8 weeks apart. In the first of these guinea pigs there were histological tubercles in the mesenteric nodes containing infrequent acid-fast rods. In both animals there were extensive peritoneal adhesions with foci of acute abscessation in the nodes, spleen, liver and omentum, but normal guinea pigs injected with triturates of the viscera and nodes of each failed to develop tubercu-





FIGURES V and VI—Tubercles of abdominal lymph nodes of guinea pigs vaccinated subcutaneously 10 weeks previously with 25 mg. of BCG. Ziehl-Neelson stain × 1,140.

PLATE IV

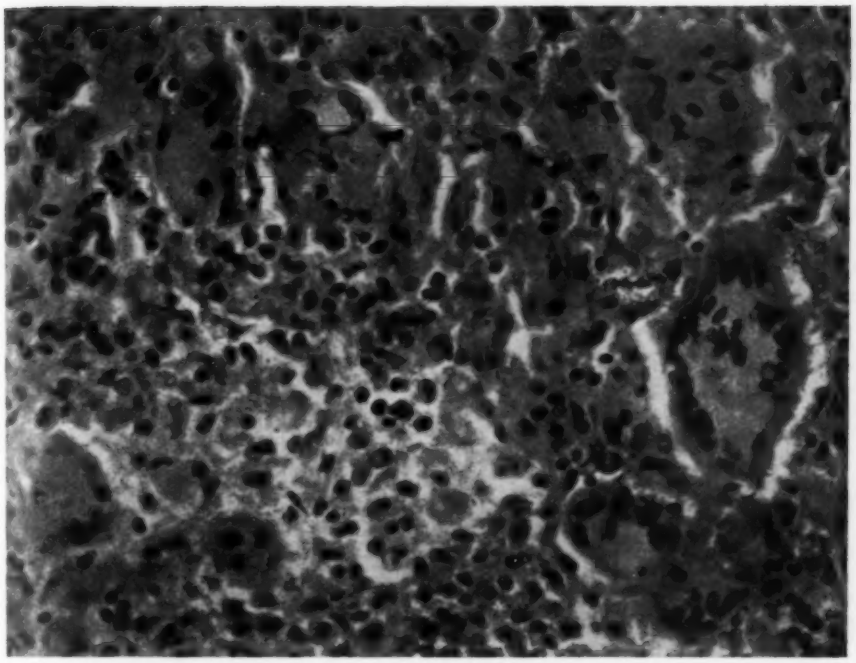


FIGURE VII—Tubercle in spleen of guinea pig vaccinated subcutaneously 10 weeks previously with 25 mg. of BCG. Ziehl-Neelson stain. × 510.

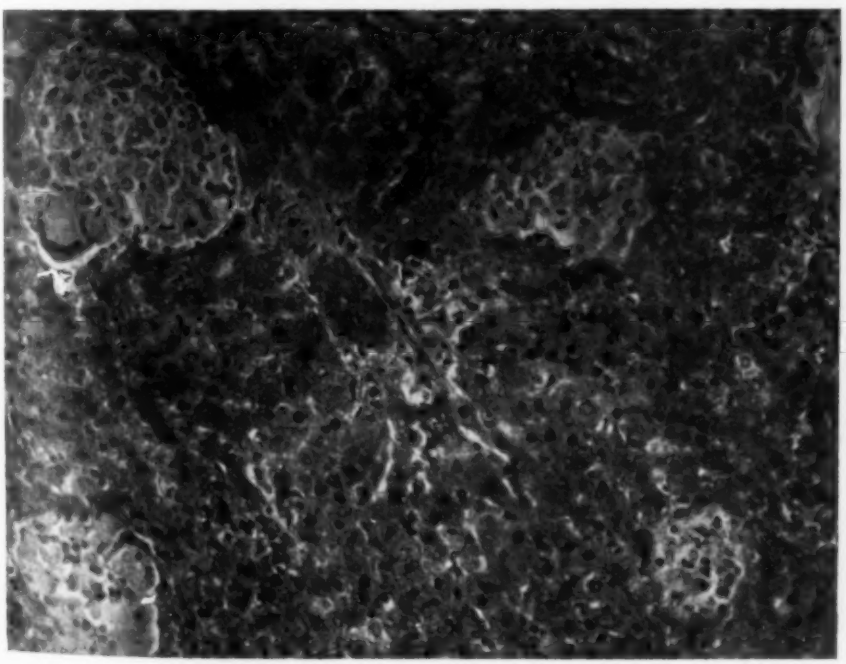


FIGURE VIII—Tubercles in liver of guinea pig vaccinated subcutaneously 10 weeks previously with 25 mg. of BCG. Ziehl-Neelson stain. × 275.

losis. It seems likely here that massive injections of the BCG so lowered the resistance that the guinea pigs developed secondary infections. Two of the 3 which were killed had only small discrete tubercles, while the 3d had also caseous omental and peritoneal nodes. Each of these guinea pigs had a few peritoneal adhesions.

INTRAPERITONEAL VACCINATION FOLLOWED BY INFECTION WITH VIRULENT BACILLI

Guinea Pigs—This series consists of 3 groups of guinea pigs which received subcutaneously 50 mg. each of the BCG vaccine, with the exception of the first guinea pig which received 25 mg.

Guinea Pigs	Interval	Infecting Dose		Result
1	10 months	0.3 c.c. human	Killed 33 weeks	Tuberculosis of viscera
1	3 months	0.2 c.c. human	Died 39 weeks	Tuberculosis of viscera
1	3 months	0.2 c.c. human	Killed 9 weeks	Tuberculosis of spleen
1	Control	0.2 c.c. human	Killed 16 weeks	Massive generalized tuberculosis
1	Control	0.2 c.c. human	Died 12 weeks	Massive generalized tuberculosis
1	Control	0.3 c.c. human	Died 10 weeks	Massive generalized tuberculosis
1	3 months	0.1 mg. bovine	Killed 33 weeks	Tubercles in nodes, spleen
1	3 months	0.01 mg. bovine	Killed 33 weeks	Tubercles in nodes, spleen
1	Control	0.1 mg. bovine	Killed 33 weeks	Massive generalized tuberculosis
1	Control	0.2 mg. bovine	Killed 33 weeks	Massive generalized tuberculosis
1	13 weeks	0.3 c.c. trit.	Died 20 weeks	Pneumonia; tuberculosis
1	13 weeks	0.3 c.c. trit.	Killed 34 weeks	Few discrete tubercles of spleen, liver and lung *
1	Control	0.3 c.c. trit.	Died 14 weeks	Generalized tuberculosis
1	Control	0.3 c.c. trit.	Died 22 weeks	Generalized tuberculosis

* Three guinea pigs were injected with triturates of spleen and nodes of this guinea pig. All were negative when killed after 20 weeks.

In summarizing this small series it is evident that in the first and last groups the vaccinated guinea pigs developed less extensive tuberculosis and in general outlived the controls. The last group is interesting in that the virulent human bacilli used for inoculation were obtained from the triturate of a vaccinated guinea pig killed 10 months after infection. Therefore, the human bacilli used for inoculation in the last animal in the 3d series had had a total residence of 74 weeks in vaccinated guinea pigs, and upon subinoculation they failed to infect 3 normal guinea pigs.

TUBERCULIN REACTION

We were unable to produce skin hypersensitiveness in 54 new-born guinea pigs and calves which were fed the vaccine. This is not in accord with the findings of Calmette.

Thirty-five of a series of 46 subcutaneously vaccinated calves had positive tuberculin reactions from 8 to 12 weeks later, but by the 32d week 27 of a group of 29 of these had lost their hypersensitiveness.

Sixteen of 23 guinea pigs and 9 of 10 monkeys were hypersensitive at 8 weeks after subcutaneous vaccination, and 16 of 19 guinea pigs were allergic 19 weeks after intraperitoneal vaccination.

In brief, 75 of 97 subcutaneously or intraperitoneally vaccinated guinea pigs, calves and monkeys developed positive tuberculin reactions, whereas 39 new-born guinea pigs and 15 new-born calves did not become allergic after being fed the vaccine.

SUMMARY

We were able to produce small discrete non-progressive tubercles in guinea pigs and monkeys which were vaccinated subcutaneously and intraperitoneally. In no instance were these lesions reproduced upon guinea pig subinoculation. After subcutaneous injection of the vaccine we were able to demonstrate progressive tuberculosis in 1 guinea pig. We are unable to account for this occurrence but suggest that it depended upon some individual susceptibility of the animal.

In 3 instances death from secondary infections has occurred in subcutaneously vaccinated guinea pigs, and in these animals we were able to find more than the usual discrete tubercle formation which has been the characteristic lesion produced by the BCG. The lesions here were modified by the secondary inflammatory changes, and triturates of these tissues when injected into normal guinea pigs failed in every instance to produce tubercles. These guinea pigs were injected with large doses of the vaccine and it seems likely that there is a danger of lowering the general resistance of the animal by massive injections of the BCG.

The results in the attempt to vaccinate animals subcutaneously were suggestive. While vaccinated animals which were later infected with virulent organisms as a rule developed more or less progressive tuberculosis, they generally developed the disease to a lesser extent than non-vaccinated controls which received the same injections of virulent organisms.

So far as the feeding results go in new-born guinea pigs and calves, no evidence has been shown of infection with the vaccine nor of protection by it in the guinea pigs. Two of 8 calves in this group did, however, show evidence of protection. In fairly young but not new-born monkeys, on the other hand, there was evidence of slight absorption; 4 monkeys out of 9 which were fed the vaccine were found at autopsy to have localized tubercles, usually in the mesenteric nodes. These findings indicate that the bacilli in the vaccine may pass the mucous membrane of the intestinal tract of monkeys. The fact that inoculation of these tubercles into normal guinea pigs failed in every

case to infect indicates the successful attenuation of our BCG cultures when grown continuously on the bile medium of Calmette. However, we do not feel justified in drawing conclusions as to the absolute safety of the BCG vaccine until further experimentation has been done covering a period of years on vaccinated animals. We cannot emphasize too strongly the importance of continuous cultivation of the BCG on the bile medium.

The impossibility of infecting normal calves with feeding of what we considered infective doses of virulent cultures shows the absolute necessity of sufficient controls; without these we would have believed that the lack of infection in the vaccinated animals indicated immunization, when it simply showed the difficulty of infecting them through the intestinal tract.

It is interesting to note that none of the guinea pigs and calves fed the vaccine developed hypersensitiveness to tuberculin, while a large majority of those receiving the BCG subcutaneously and intraperitoneally became allergic. The hypersensitiveness usually appeared by the 8th week and seemed to last on an average from 6 to 10 months. In monkeys, in contrast to guinea pigs and calves, the bacilli in the vaccine passed the intestinal mucosa, and produced hypersensitiveness and localized tubercles in the mesenteric nodes. We feel certain that the positive findings in the orally vaccinated monkeys arose from the BCG, since 24 normal control monkeys failed to react to tuberculin and were negative at autopsy.

REFERENCES

1. Nobel, Edmund. *Wien. Klin. Wchnschr.*, No. 3 (Jan. 19), 1928.
2. Gerlach, F. *Ztschr. f. Immunitätsforsch. u. exper. Therap.*, 51: 256, 1927.
3. Petroff, S. A., and Branch, A. *A. J. P. H.*, 18, 7: 843 (July), 1928.

NOTE: The authors express their thanks to Dorothy Caldwell for assistance in the preparation of the manuscript, to Marie H. Krancher for laboratory assistance and to Robert M. Burnett for his gift of 40 calves used in the work.

Photomicrographs by Arthur R. Riddle of the Hegeman Memorial Research Laboratory.

Ultra-Violet Ray Therapy and Public Health Clinics*

HENRY J. GERSTENBERGER, M. D., FELLOW A. P. H. A.

Director of Pediatrics, Babies and Children's Hospital, Cleveland, O.

ULTRA–VIOLET ray therapy as it is generally used today consists in exposing for varying periods of time a greater or lesser area of uncovered skin to artificially produced radiant energy, containing in addition to other rays those having wave-lengths measuring from 2,900 to 3,100 Angstrom's units (A. U.), and being of an intensity sufficient to produce an erythema.

The two practical artificial sources of these rays in general use at the present time are the quartz enclosed mercury vapor arc lamp and the unenclosed carbon arc lamp. In the form in which industry has made them available for use in home and office practice the quartz mercury vapor arc is the more bountiful source of these special rays. However, by replacing the core of the carbon sticks with minerals such as iron, aluminum and nickel and by using a greater amperage it is possible to obtain from such carbon arcs a quantity of the 2,900 to 3,100 Angstrom's wave-length rays equal to that produced by the quartz mercury vapor arc lamps.

The carbon arc, in addition to these rays, produces in much greater quantities luminous and infra-red rays, the former and some of the latter of which are considered by Sonne and others to be responsible for some of the beneficial results generally credited entirely to the ultra-violet rays.

A priori, one would imagine that a source of radiant energy giving off a light whose spectrum corresponds closely with that of summer sunlight would have therapeutic advantages over any other kind of artificial light. This idea would seem to be substantiated by the opinion rather generally held by men who are treating tuberculous patients; namely, that sunlight as a therapeutic agent is decidedly superior to any artificial source of radiant energy. It should be kept in mind, however, that when an individual is exposed out-of-doors to the rays of the sun he is at the same time being subjected to a variety of

* Read before the Health Officers Section of the American Public Health Association at the Fifty-seventh Annual Meeting at Chicago, Ill., October 16, 1928.

additional climatic factors which in themselves may be of great influence in improving the condition and resistance of his body. Consequently, it is possible that, after all, the beneficial therapeutic effect derived from sunlight is principally or even solely due to the action of the narrow band of ultra-violet rays above referred to. This conclusion, however, apparently has been proved to be applicable to but one disease, rickets. A. F. Hess and others having found by the use of filters that rays of wave-lengths of 3,200 Angstrom's units and above have no antirachitic value, while those of 3,100 to 2,890 Angstrom's units have. For tuberculosis and other diseases, such as anemia, respiratory tract infections, chorea, pertussis, etc., such a specific finding has not been satisfactorily made.

Webster, Colebrook, Eidinow and Hill, however, have shown that doses of ultra-violet rays which produced erythema increase the non-specific bactericidal power of the blood for a period varying from 1 to 4 hours. They obtained some evidence of a preliminary stage of depression of the hemo-bactericidal power ½ hour after exposure. They state that absorption into the blood of the products of tissue damage or the enhanced absorption of normal tissue products produced by such damage with the consequent erythema and edema appears to be a natural excitant of immunizing mechanisms, whether the damaging agent be ultra-violet rays, visible rays, dark heat or blistering agents. In some cases they found, when large areas and intense dosage were utilized, a decided fall in the bactericidal power. They conclude that the intensity of the erythema produced and the surface area of skin irradiated per kilogram body weight control the bactericidal response of the blood to irradiation of the skin.

Whether the improvement which, according to most observers, follows ultra-violet therapy in peritoneal and glandular tuberculosis and in scrofula is due to products of tissue damage, or whether it is produced by the absorption of some photosynthesized product other than irradiated ergosterol, or whether both or still other factors are responsible, is impossible to state. Our own experience with the use of ultra-violet rays in the treatment of pulmonary tuberculosis, especially of the types characterized by lobar exudates, even when they proceed to cavity formation, has been surprisingly good, and much better than reported in the literature. However, a speedy cure following exposure to ultra-violet rays such as is regularly witnessed in rickets is not seen in tuberculosis, except in the rarest instances.

Inasmuch as no specific ultra-violet ray deficiency disease except rickets has been established so far, it is necessary to assume that all beneficial effect of irradiation in other conditions or diseases is due to the development and action of one or more non-specific factors.

This fact limits scientifically preventive ultra-violet therapy to rickets. This disease, however, is quite as satisfactorily prevented and cured by the use of the more economic and old-fashioned cod liver oil or by the ingestion of small doses of the modern irradiated ergosterol. Consequently, there is no justification for establishing ultra-violet ray clinics for the prevention of this disease.

It should be stated at this point that it has been demonstrated that the antirachitic value of irradiated material can be reduced and completely destroyed by further and excessive exposure to the quartz mercury vapor arc, and also that animals can be killed by giving irradiated ergosterol in too liberal quantities. Both of these observations indicate that great caution must be exercised both in its preparation and in its use.

As ultra-violet therapy has not been proved to be a specific agent in the cure of tuberculosis, anemia, respiratory infections, etc., and as it is known that these diseases develop in individuals who have had the benefit of their use, and as the disease which is specifically cured by the ultra-violet rays, namely, rickets, has not been demonstrated to be present in those above the age of 3 years, it would seem unwise to advocate at this time the general establishment by public health departments of the rather expensive ultra-violet ray clinics for the prevention of disease. I come to this conclusion in the face of my own conviction, based upon clinical experience, that the exposure to ultra-violet rays, properly managed, is of value not only to infants but to children and adults during the winter months in those parts of the country where climatic conditions make impossible an adequate exposure of the individual's skin to ultra-violet rays.

I see no objection, however, to collecting observations on a big scale, over a period of 5 to 10 years, on the efficacy of ultra-violet ray exposures on the general health of school children. If half of the school children for 5 consecutive years can be exposed in a minimal fashion and under proper supervision to the ultra-violet rays, while the other half remains unirradiated, evidence may be obtained which will justify the expenditure of funds coincident with the establishment and operation of ultra-violet clinics.

Another reason for hesitating to advocate at this time the use of ultra-violet ray therapy by public health clinics in the prevention of disease is the fact that we probably know but little concerning the functions of the radiant energy produced by the lamps under discussion. In a statement prepared by the Council on Physical Therapy of the American Medical Association for the Scientific Exhibit at the Minneapolis meeting, it was emphasized that:

Before light can be used therapeutically with the best results, its relation between effect and wave-length must be well understood. Thus far, probably but one of the physiological effects of radiant energy has been studied with a desired thoroughness, namely the effects of visible light in arousing the sensation of vision. The efficiency of the human eye has been accurately determined by the different wave-lengths in the visible zone of the spectra, and a curve called the luminosity curve has been plotted showing the variation of efficiency with wave-length. Not only does this curve vary with different persons but it also shifts with a change in the intensity and the spectral energy distribution of the source of light.

In his address at the last meeting of the American Medical Association, Dr. William T. Bovie expressed the same view and emphasized that actino therapy today still is a complicated subject.

In conclusion, let me say that from the standpoint of the best and greatest development of preventive medicine it is my conviction that scientifically established facts, adequate clinical substantiation of their practical value and conservatism should be the guides of a health agency in determining its course of action in actively furthering the prevention of disease.

Swiss Law Requires Measures Against Tuberculosis

SWITZERLAND'S Federal Law of June 13, 1928, requiring measures for the prevention and cure of tuberculosis is soon to go into effect. Heretofore, certain cantons and municipalities have had regulations for this purpose, but this is the first time that comprehensive measures on a national scale have been prescribed.

The law requires that all cases of tuberculosis in a contagious stage be reported to the government by the attending physicians and that medical supervision be given children and teachers in all schools, asylums, and similar institutions. Any pupil or teacher with tuberculosis in a contagious stage is to be removed from the school or institution, and when necessary is to be given free treatment.

The cantons are required to take certain measures for the prevention and treatment of tuberculosis, such as establishment of health centers, vacation camps for children predisposed to tuberculosis, preventoriums, convalescent homes, and sanatoriums. The law also requires the cantons to see to it that employment agencies for tuberculous patients are established wherever necessary.

Detailed regulations are prescribed for housing and public hygiene and for education of the public in personal hygiene. The work of enforcement is to be carried out by the federal government, the cantons, and the municipalities, in coöperation with private agencies. The cost of the work is to be met by the federal government and by the cantons.—*Bull. des Eidgenossischen Gesundheitsamtes*, Bern, No. 31, 1928, supplement.

The Effect of Various Types of Shoes upon the Feet and Posture of High School Girls*

IZA WHITE MERCHANT AND KATHERINE CRANOR

Department of Home Economics, Iowa State College, Ames, Ia.

AN experiment to determine the effect of various types of shoes upon the feet and posture of high school girls was carried on by the authors in coöperation with the departments of physical education of the high schools of Ames, Ia. Three hundred and sixty-eight high school girls participated in the experiment.

Shoes were examined as to type, and measured; feet were measured and examined for defects; and footprints were taken.

To determine the relation of posture to shoes, schematograph pictures of back and side views were made of 167 senior girls.

X-ray pictures were made of normal and defective feet with and without shoes, and of feet when both low and high heels were worn. X-rays were also made to determine the effect of high heels upon the position of the bones of the pelvic region.

Posture defects noted among 42 girls wearing high heels:

36 neck bent forward
32 protruding abdomen
42 narrow curve between shoulder and hip

X-ray pictures indicate a tilt of 40° in pelvis when extremely high heels were worn, muscles in upper leg not exercised, muscles in lower leg over-exercised, shape of leg spoiled by the muscles being pushed to back of calf.

Posture in every instance was better in bare feet than with high heels. Eighty-nine per cent of the girls having good feet had good posture.

In every instance, where a girl had one high hip and one high shoulder, she was found to have an overdeveloped foot on the opposite side.

COMPARISON OF RESULTS

	1927 Per cent	1928 Per cent
Girls wearing oxfords	60	80
Shoes short and narrow	77	20
Poor longitudinal arches	72	60
Poor transverse arches	90	80
Flat feet	40	10
Rotating heels	62	55
Corns or callous	54	78
Normal feet	1	3

Improvement noted in the choice of shoes over those of 1927 was 37 per cent. Of last year's girls there were 14 per cent who had improved the condition of their feet. The girls whose feet were outstandingly good or bad last year are the same ones this year.

* This is an abstract of a monograph published by the authors. It also gives additional material which was discovered in the continuation of the study begun in 1927.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

EDITORIAL COMMITTEE

MAZŸCK P. RAVENEL, M.D., *Chairman* HOMER N. CALVER, *Managing Editor*

C. C. YOUNG, LOUIS I. DUBLIN, PH.D., E. R. HAYHURST, M.D., MERRILL E. CHAMPION, M.D., ARTHUR P. MILLER, C.E., HENRY F. VAUGHAN, D.P.H., EVART G. ROUTZAHN, C.-E. A. WINSLOW, DR.P.H., WALTER S. FRISBIE, SOPHIE C. NELSON, R.N.

WORLD HEALTH CONDITIONS

THE annual report which the Surgeon General of the U. S. Public Health Service has just submitted to Congress is interesting on account of the summary of world conditions which it gives, and also as it demonstrates once again the high degree of protection given to the people of this country by that service. Not only does the service gather knowledge daily as to the prevalence of communicable diseases in every part of the world, but there is also medical examination of immigrants about to sail for this country and inspection of the vessels and seamen, in addition to which a second medical examination must be undergone at the port of arrival. During the year no case of any quarantinable disease was brought into our country.

In general the past year has been a favorable one in regard to health. There were no great epidemics, and the efficiency of modern health organization was demonstrated by the fact that in no country in which such organization has been established has there been an outbreak of any of the diseases which in the past we have had so much cause to fear.

Bubonic plague still appears to be the disease which is our chief menace, India being the great potential focus of infection. However, cases were reported from French Indo-China, China, Algeria, Madagascar, Nigeria, Siam, Argentina, Ecuador, South Africa, Greece and Russia. Two cases, contracted from ground squirrels, occurred in California, the only ones reported on the North American continent.

Yellow fever, apparently of a peculiarly virulent type, occurred in a number of places in Africa, especially along the west coast. Of more direct interest was the fairly extensive epidemic in Rio de Janeiro, beginning in May, 1928. The case fatality rate was 55.5 per cent.

Smaller outbreaks occurred in some other South American ports and interior cities.

While typhus fever has not been unduly prevalent in Europe, recent studies show that it is endemic in the United States, especially along the Atlantic seaboard and in the lower Rio Grande Valley. Fortunately it is of a mild type.

Smallpox continues to be a blot upon our record. Approximately 34,000 cases occurred in the United States in 1927. With the exception of India, we lead the world in this respect. Certainly there is a call for especial activity on the part of health officers and health workers to combat the false ideas which are constantly being put forward in regard to vaccination, as well as the apathy of the public in regard to this simple, safe and efficient preventive.

Attention is called to the death rate from two diseases which are too generally considered insignificant, and necessary to childhood—measles and whooping cough. In the reporting states, some 4,000 deaths occurred from measles and 7,000 from whooping cough during the year 1927, figures which prove that these diseases call for care and are not to be regarded as trivial.

The work of the Service in keeping in touch with world conditions has been tremendously aided by the Health Committee of the League of Nations, and as far as the Eastern countries go, by the establishment of a reporting station at Singapore. This station collects information from India, China, Japan, the Malay states, the Philippines, Borneo, Australia and the east coast of Africa. It is cabled weekly to Geneva, where it is combined with similar reports from Europe and America, and the final results relayed to all parts of the world.

Those who keep in touch with the *Public Health Reports* are more or less familiar with many of the facts contained in the interesting report of the Surgeon General, which, however, summarizes the information from all parts of the world for the entire year.

METHODS OF SECURING THE 1930 CENSUS BY SANITARY AREAS FOR CITIES

AN increasing interest, on the part of health officers and executives of volunteer health agencies of cities, in the permanent area basis for enumeration of city populations has developed with the approach of the 1930 decennial census.

The procedure necessary to obtain this from the U. S. Bureau of the Census is simple and should be understood by those concerned with

the accurate analysis of such health and social problems of their communities as depend for their solution upon complete data regarding the population in small areas with permanently established boundaries.

New York, Cleveland and St. Louis are the only cities which have availed themselves of the willingness of the U. S. Bureau of the Census to assist communities in obtaining neighborhood facts.

Although New York (which furnished a map for the 1910 Census) was the only city that furnished the Bureau with permanent maps for the taking and tabulation of enumeration data, the Bureau, of its own motion, subdivided the political units used by itself for publication purposes into census tracts, in the case of all cities of 500,000 population and over, and the tabulated results were and are at the service of local committees who will undertake their transcription for publication. In 1920 this service was repeated.

New York's population of 1910 was tabulated and the data were published by the Cities Census Committee in terms of 707 neighborhood units. Its map of 1920, with an increase to 3,427 units resulting from the subdivision of all areas of over 80 acres, was the basis of 1,630 neighborhood tabulations by the Bureau and of their publication by the coöperating New York committee.

The map of 1920 is New York City's permanent map for neighborhood census enumeration and tabulation, and one of the functions of its local committee, essential to the system, is to keep the same up to date as to street nomenclature and layouts, and to furnish the Bureau, on the eve of every census, with accurate maps, in sufficient quantity, for actual enumeration.

Chicago, Cleveland, Detroit, St. Louis, Pittsburgh, Boston and any other city anticipating the benefits of a permanent area basis for its 1930 enumeration and tabulations, must furnish the Geographer's Division of the U. S. Bureau of the Census with a uniform area unit map which will register the community's own drafting of its neighborhood boundaries. While New York City's census tracts, or sanitary areas as they are commonly called, are of approximately 40 acres each, probably an area of 160 acres for each such unit would serve the purpose satisfactorily in other cities.

This primary procedure in order that any city may receive the benefit of a permanent area basis for its enumeration and tabulations is necessary because of the extensiveness and complexity of the tasks of the Geographer of the Census. He must assemble, or prepare, for every square foot of the continental area of the United States and of its outlying possessions the office and field maps which are indispensable requisites for the 1930 Census.

To have ready for the portfolio of each of the 100,000 or more enumerators likely to be engaged in the 1930 Census, a map of the territory to be covered by him, and to be sure when all the portfolios have been distributed that no area of human habitation has been omitted, is a Herculean task. If to this the cities of the nation, desiring tabulations of neighborhoods smaller than those essential to the Bureau's own publication plans, add the task of subdividing their areas into permanent units for supplying them with information more detailed than the resources of the U. S. Bureau of the Census allow it to print, they are asking the Geographer to imperil what is imperative in the discharge of his duties, and are, moreover, asking him to perform a task for which the necessary data are not available in the U. S. Bureau of the Census.

One of the publications of the Bureau (*Financial Statistics of Cities having Population of 30,000 or Over,* U. S. Dept. of Commerce, 1925) gives the total area of all cities of 30,000 or over in the United States; but there is no Census publication giving the area of wards or other political subdivisions of cities, and without an area measurement of the units used by the U. S. Bureau of the Census itself, these units cannot be subdivided intelligently for a permanent map.

Experience has shown that there are many cities in the United States in whose engineers' offices cannot be found acreage measurements of the units employed by the Bureau for tabulation and publication purposes, and any city that expects the Geographer of the Census to institute a permanent area basis when the data requisite therefor are not in existence, is expecting too much.

A worker in Washington, moreover, cannot be expected to be so minutely familiar with the topography of all American cities as to be able, even when ward or other acreages are known to him, to subdivide such acreage into units most usable for the local community. This is a job suitable for a local committee.

These considerations compel the preparation, by any city desiring a permanent area basis, of a neighborhood map in which the entire area of the city is divided by established street boundaries into 160-acre tracts or multiples of them, using the official map of the city as the basis therefor. This map must be registered before July 1, 1929, with, and be accepted by, the Geographer of the Census for the taking and tabulating of the Census of 1930.

Any city which does not take this step deliberately excludes itself from participation in any tabulation of its population other than that required for the U. S. Bureau of the Census for its own purposes.

This, however, is not the whole of the matter. In a recent com-

munication to the coöperating New York committee the Director of the Census says:

> I have given instructions that the tract system shall be abandoned unless the cities (i.e., through some organization of authority) give us a definite promise that the material will be utilized somewhat as you utilized it for New York. The tabulating of this great mass of detailed material by tracts and then laying it aside is, to my mind, a wasted effort.

A city, therefore, desiring the benefit of a permanent area basis for neighborhood tabulations of its population must not only equip itself with some kind of organization which will prepare for the Geographer's Division a map which will enable that division to take the enumeration in such wise that the tabulation can be produced, but must be able to assure the Bureau that the tabulation when produced will be transcribed for publication by a local committee in such wise as to meet the needs of neighborhood population survey and service in its local community.

The Cities Census Committee, Inc., 200 Fifth Avenue, New York, N. Y., which exists primarily to secure to New York City, and cities of 100,000 in its immediate neighborhood, the benefit of a permanent area basis for population enumeration and tabulation, and whose charter permits it to assist other cities of similar size in securing the same benefits, puts its experience at the disposal of all communities interested in this subject.

ASSOCIATION NEWS

A. P. H. A. ACKNOWLEDGES INTEREST OF STATE HEALTH PUBLICATIONS

The Association wishes to express its appreciation to the many state and local health departments who have aided in disseminating information of the activities of the Association, especially through the columns of their weekly and monthly health bulletins. The New York State Department *Health News* recently carried an article on "The Appraisal Form for City Health Work, 3d Edition, 1929," which brought this new volume to the attention of many health workers who might not otherwise have been reached. Likewise the Christmas issue of the West Virginia *News Letter,* published semimonthly, offered its coöperation by publishing the "Season Greeting" sent out by the Committee on Administrative Practice, A. P. H. A.

DR. DAVIS DIES OF HEART ATTACK

William H. Davis, M.D., chief statistician of the Bureau of the Census, Washington, D. C., died January 8 in Washington of a heart attack while ill with influenza. Burial was in Washington, January 11.

Dr. Davis was an untiring worker in the Association, having served as vice-president during 1923–24 and taken an active part in the program of the vital statistics section. At the time of his death he was chairman of the Committee on Forms and Methods of Statistical Practice.

MISS JEAN GOES TO THE ORIENT

Sally Lucas Jean, health education consultant and one of the organizers of the Child Health Organization and later director of the health education division of the American Child Health Association, sailed January 12 from Seattle for the Philippine Islands where she will develop a health education program in the schools at the request of Governor-General Henry L. Stimson. Miss Jean will inaugurate the program which will be carried out over a 2-year period by Miss Edna Gerken, supervisor of health education, Fall River, Mass. Miss Jean will spend several weeks in Japan conferring with educational and health authorities, and in Hawaii she will represent the American Public Health Association.

Miss Jean is a member of the Advertising Committee of the A. P. H. A., the Committee on Exhibits, and of the recently organized Committee on Co-operation, Development and Finance.

DR. GOLDBERGER DIES IN WASHINGTON

Dr. Joseph Goldberger, 55, world famed scientist, discoverer of the cause of and cure for pellagra, and a Fellow of the A. P. H. A., died January 17 in the U. S. Naval Hospital in Washington, D. C., following a long illness. The cause of Dr. Goldberger's illness had been undetermined, but an autopsy showed that all his vital organs had been attacked by a malignant growth.

Dr. Goldberger was born in Austria-Hungary and came to this country when he was 7 years old. He received his medical education at Bellevue Hospital Medical College and later interned at that hospital. He practiced in New York City and Wilkes-Barre prior to entering the U. S. Marine Hospital Service, which later became the U. S. Public Health Service.

Three times Dr. Goldberger's life was endangered, once while he was on duty

at the American Consulate in Tampico, Mex., when he contracted yellow fever, again when he was studying typhus fever in Mexico City, and another time while he was investigating an epidemic of dengue fever.

Fourteen years ago Dr. Goldberger began his research work in pellagra which resulted in his conclusion that pellagra is caused by improper diet and can be cured by correct diet.

In commenting upon his death Assistant Surgeon General Kerr said that Dr. Goldberger's experiments had been of great economic importance to the country and that his contribution compared with that of Dr. W. C. Stiles, who discovered the cause of hookworm infection, and Dr. Walter Reed, who discovered yellow fever.

NEW MEMBERS

Howard W. Adams, Bloomington, Ill., Chemist, Bloomington Normal and Sanitary District

Ellen M. Atchison, R.N., Detroit, Mich., General Supervisor, Metropolitan Life Insurance Company

Milford E. Barnes, M.D., Greenville, O., Health Commissioner Darke County and City of Greenville

Alexander F. Barron, B.S., Chicago, Ill., District Manager, Paradon Manufacturing Company (Assoc.)

Grace Baze, R.N., Longview, Tex., Public Health Nurse, Gregg County

Margaret Bell, B.S., Ann Arbor, Mich., Professor of Physical Education and Physician to Health Service, University of Michigan

Elizabeth A. Bessey, B.A., Detroit, Mich., Director of Child Health Education, Tuberculosis and Health Society

Mattie F. Buck, R.N., Canaan, Conn., Public Health Nurse

Eugene J. Bumiller, Glendale, Calif., Sanitary Supervisor, County Health Department

John R. Cain, M.D., Urbana, Ill., Assistant Professor of Hygiene, University of Illinois

Henry G. Callison, M.D., Newberry, S. C., Health Officer, Newberry County

A. Pena Chavarria, M.D., D.P.H., Bogota, Columbia, Director National Hygiene Institute (Assoc.)

George J. Deyo, D.Sc., Elizabeth, N. J., practicing chiropody and maintaining foot clinic

B. V. Elmore, M.D., Rome, Ga., Commissioner of Health

Gail J. Fink, Chicago, Ill., Director of Research, National Aluminate Corporation (Assoc.)

Raymond H. Franzen, Ph.D., New York, N. Y., Director of Research, School Health Study, American Child Health Association

Joseph E. Greaves, Ph.D., Logan City, Utah, Professor of Bacteriology and Public Health, Utah Agricultural College

Elisabeth C. Hartmann, R.N., Dubuque, Ia., Staff Nurse, Visiting Nurse Association

Walter J. Imig, B.S., St. Paul, Minn., Bacteriologist, State Dairy and Food Department

Lawrence F. Lindgren, M.S., Lincoln, Neb., Instructor in Bacteriology and Pathology, University of Nebraska

Eschscholtzia L. Lucia, Ph.D., Berkeley, Calif., Assistant Professor of Biometry, Department of Hygiene, University of California

Frank J. Mara, Trenton, N. J., Investigator Mercer County Health League

Sarah B. Meyers, R.N., DeLand, Fla., County School Nurse

Frank W. Miller, New Brunswick, N. J., Associate Entomologist, New Jersey Agricultural Experiment Station

Louis Mitchell, B.S. in C.E., M.S., Syracuse, N. Y., Dean and Professor of Civil Engineering, Syracuse University

Claude A. Neavles, St. Louis, Mo., Director of Physical Education, Y. M. C. A.

Carmen P. Osler, A.B., Columbus, Miss., Instructor in Physiology and Hygiene, Mississippi State College for Women

Albert F. Porzelius, B.S. in C.E., Chattanooga, Tenn., Superintendent City Water Company

Herbert C. Schettler, Royal Oak, Mich., Food and Milk Inspector

Herbert A. Seymour, Chicago, Ill., General Secretary, Commonwealth Edison Mutual Benefit Association (Assoc.)

Robert C. Strode, M.D., Olympia, Fla., District Medical Officer, State Board of Health

Anna L. Tittman, B.S., R.N., New York, N. Y., Vocational Secretary for Public Health Nursing, Joint Vocational Service

Nelson P. Yeardley, M.D., Parkersburg, W. Va., School Physician, Parkersburg Independent District

PUBLIC HEALTH ADMINISTRATION

HENRY F. VAUGHAN, D. P. H.

Conference on Influenza, January 10, 1929—A conference was called by Surgeon General Hugh S. Cumming in Washington, D. C., to discuss the influenza situation. This conference was attended by approximately 100 representative physicians and public health workers from all parts of the country. The resolutions adopted at the conference were drafted by three committees appointed for this purpose. One committee dealt with scientific research, a second committee dealt with preventive measures, while the third committee discussed epidemiological studies.

The following is the report of the committee on preventive measures:

REPORT OF COMMITTEE ON PREVENTIVE MEASURES

When influenza is prevalent or is believed to be approaching a community, during the course of an epidemic it is advisable to take advantage of the public interest and concern by emphasizing anew those public precautions and practices of personal hygiene upon which the prevention of communicable affections of the upper respiratory tract depends.

Measures for precaution fall naturally under those of a communal or administrative character and those which apply to the individual:

I. *Communal or Public Precautions*

1. Efforts should be made to reduce the opportunities of direct contact infection by avoiding crowds.

2. Schools or colleges should not be closed wherever adequate medical and nursing supervision is available and provision is made for the prompt exclusion of all persons showing suspicious catarrhal symptoms, especially when these are associated with a rise of temperature.

3. The reopening of boarding schools and colleges after vacation should not be encouraged in the presence of epidemic influenza unless there are generous accommodations for the bed care of those who may be attacked.

4. While the general closing of places of public assemblage is to be deprecated, there may be local conditions justifying such action at the discretion of the local health authorities.

5. In groups which can be brought under daily professional inspection the isolation of early and suspicious cases of acute respiratory tract infection, particularly when these are accompanied by rise in temperature, may result in delaying the spread of the disease.

6. In isolated communities and in institutions infection may be delayed and sometimes avoided by the strict exclusion of visitors.

7. The person and sick room of an infected individual must be considered a definite focus of infection, and visitations to such persons or premises should be avoided by all persons except the necessary medical and other attendants.

II. *Education in Cleanly Personal Habits*

When influenza prevails or threatens, information on the subject of cleanly personal habits and personal hygiene should be spread widely, particularly with regard to the following points:

1. Avoidance of all uncovered acts as in coughing, loud talking, sneezing or spitting.

2. Special emphasis upon the need of washing the hands frequently, more especially before eating; unclean articles and fingers should be kept out of the mouth and nose. This advice is particularly applicable to all persons in attendance upon the sick.

3. Avoidance of exposure, fatigue and any bodily excess.

4. Persons in good health should continue in their normal manner of life.

III. *Advice to Individuals for Guarding against Colds, Upper Respiratory Infections and Influenza*

It would seem advisable that in the presence of influenza or upper respiratory infections individuals should make more than the ordinary effort to increase well-being. This may be obtained by:

1. Securing adequate sleep and rest (8 to 10 hours' sleep every night with windows open, but under enough covering to keep warm).

2. Eating a moderate, mixed diet and partaking freely, at regular periods, of pure water (6 to 8 glasses daily).

3. Wearing clothing to suit the environment, particularly clothing which prevents chilling of the body surfaces and which keeps the body dry.

4. Avoiding people with colds, especially those who are sneezing or coughing. There is more danger from contact with those just beginning to feel sick than from those ill enough to be confined to bed.

5. Keeping out of crowds so far as possible, especially crowds in closed places.

6. Avoiding the use of common towels, wash basins, glasses, eating utensils, and toilet articles.

7. Washing the hands thoroughly before eating.

8. Avoiding the use of any so-called preventives. Vaccines, serums and advertised preventives seem to be of no value and may be harmful in this disease.

9. Avoiding alcohol and stimulants of all sorts.

IV. *What to do to Prevent Becoming Seriously Ill if You Get the Disease*

1. If you have a cold, feel ill, or are feverish, go to bed at once, cover up warmly and have the windows open; send for a physician and follow his instructions.

2. Do not take any so-called cures. There is no specific cure for this disease.

3. If you cannot get a doctor, remain in bed, eat a simple diet, take plenty of fluids, such as water, fruit juices, milk, bouillon, hot soups, at frequent intervals. Use a mild cathartic, if constipated.

4. Remember that the most important measure of preventing pneumonia or other serious complications is to remain in bed until all symptoms have disappeared and then, under the physician's advice, to return very gradually to your usual physical activities, being sure to rest before you get tired.

HENRY A. CHRISTIAN, *Chairman*,
THEODORE B. APPEL,
HAVEN EMERSON,
JAMES P. LEAKE,
FRANK SMITHIES,
H. F. VAUGHAN,
R. C. WILLIAMS.

Scarlet Fever—In 1925, 2,124 children in the Michigan Home and Training School were tested by the Dick method and 37.6 per cent found positive. These were immunized with 500 skin test doses followed by 1,000 to 1,500, and as a 3d dose 3,000 to 4,500. A re-Dick test 21 days later showed 61 per cent still positive. To these a 4th dose of 5,000 skin test doses was given. Fourteen days later 11 per cent were found positive. Additional doses were given until all cases except those lost track of gave negative Dick test. Three years later a retest of 577 of the original 799 children indicated that 29.3 per cent had changed from negative to positive.

In a smaller group immunized in 1926 with larger doses, it was found that 34 per cent had become positive by May, 1928. Although scarlet fever did appear among children later admitted to the institution and used as controls, and did in one instance occur in a child which had given a negative Dick test, the officers of the institution have concluded that scarlet fever has been controlled by such immunization. Since January, 1927, there has been no scarlet fever in the institution in which prior to the initiation of immunization scarlet fever was almost constantly present. The Michigan Department of Health has also used active immunization to prevent scarlet fever in other state institutions and with the coöperation of local physicians and health officers has given 8,000 1st doses and 6,900 3d doses in some 125 towns scattered throughout the state. Reactions have been watched very closely. About 7 per cent of susceptible persons treated will develop nausea after the 2d or 3d dose; about 4 per cent nausea, vomiting and purging, and about 2 per cent nausea, vomiting, purging and rash. The reactions are those of toxemia and are transitory

seldom lasting more than 24 hours.—Guy L. Kiefer, The Value of Active Immunization against Scarlet Fever, *J. A. M. A.*, 91: 1885 (Dec. 15), 1928.

Infantile Paralysis in Massachusetts—In 1927 there were reported 1,189 cases of infantile paralysis in Massachusetts. The Harvard Infantile Paralysis Clinic at the Children's Hospital has been treating 636 of these cases, more than half of the total number. The epidemic affected the eastern part of the state, there being 277 cases in Boston and 111 cases in Haverhill. The incidence rate in Boston was 0.35 per 1,000, in Haverhill it was 2 per 1,000, while in Ipswich, a small town thirteen miles east of Haverhill, there were 26 cases with an occurrence rate of 4 per 1,000. The death rate in the 1927 epidemic was 14.2 per cent compared with death rates of 23.5 in 1916 and 20.7 in 1920. The average age of the patient was 5.4 years. Instances of more than one case in the same family occurred 32 times in 755 families, or 4.2 per cent. One family in Haverhill had 4 children affected, in 2 of whom the disease proved fatal.—A. T. Legg, An Analysis of the 1927 Epidemic of Infantile Paralysis in Massachusetts, *J. A. M. A.*, 92: 31 (Jan. 5), 1929.

Whooping Cough—A freshly prepared vaccine was administered to 100 patients subcutaneously. At first injections of 1, 2 and 3 billion of killed *B. pertussis* (Bordet-Gengou) were given at 3-day intervals. Later the dosage was increased to at least 3, 4 and 5 billion bacilli. The vaccine was prepared from newly isolated strains from typical cases. In none of the 100 children was the disease prevented, although quite a number of patients were given the vaccine very early. Five of 6 infants exposed to older patients in their households received 3 inoculations during the catarrhal or early paroxysmal stage, but all developed severe pertussis.

A study of cases indicated that a father, who contracted the disease from his barber, gave it to his 4-year-old son. There is also history of a patient of 6 having had whooping cough twice, the first attack being at the age of 2 years. In the second attack the Bordet-Gengou bacillus was found on the cough-plates.

White and differential blood counts were made on most of the patients. In complicated broncho-pneumonia counts were high but the proportion of lymphocytes was lower. In some mild but unquestionable cases the white cell counts never exceeded 10,000 per cu. mm. In no mild uncomplicated case was the count very high; in no severe case was it low.

Bordet's method of isolating the bacilli was employed. Of 34 cases 97 per cent were positive during the catarrhal stage of the disease. Of 50 cases, 50 per cent were positive in the paroxysmal stage. During the decline of the disease the bacilli were not found in any of 16 cases examined.

The high mortality rate in pertussis patients warrants recourse to all known means of early diagnosis. Infants and very young children should be protected from patients and exposed susceptible children. This can be done only by early quarantine. If health departments would include in their service whooping cough diagnosis by means of the cough-plate, an earlier diagnosis could be made and an earlier quarantine established.—L. W. Sauer and L. Hambrecht, Whooping Cough, *J. A. M. A.*, 91: 1861 (Dec. 15), 1928.

LABORATORY

C. C. YOUNG

FOOD POISONING BY BACTERIAL TOXINS

R. W. PRYER, D. P. H., FELLOW A. P. H. A.

State Department of Health Laboratories, Lansing, Mich.

IN MANY reported cases of food poisoning the rapid onset of symptoms has led skilled investigators to conclude tentatively that soluble, more or less heat resistant, toxins played an important rôle.[1]

The following report of a food poisoning case is believed to be an example of food poisoning by bacterial toxins with a reasonable amount of proof of the probable nature of the infecting organism despite the fact that viable organisms of any of the commonly accepted food poisoning group were never isolated.

In view of certain unusual incidents connected with this case, the two laboratories concerned will be referred to as Laboratory A and Laboratory B.

In March, 1926, a specimen of corned beef was sent in to Laboratory B from one of the smaller cities of Michigan with the information that the attending physician was quite certain that the meat in question had caused illness in a family. Laboratory B referred the letter and specimen to Laboratory A. The director of Laboratory A received the specimen and turned it over to analyst "X" for examination. Analyst "X," becoming convinced from a cursory examination of the meat that it was not the cause of the trouble, ate some of this meat and persuaded 3 others to do the same. As a result of this unofficial act, all 4 were taken ill in about 2½ hours with cramps, vomiting and profuse diarrhea followed by extreme prostration. All 4 were definitely out of danger in 24 hours and the result of the unofficial test was to convince all parties concerned that the offending article of food had been isolated.

The specimen of meat was then turned back to Laboratory B and the remainder of the bacteriological work done at that time was performed by analyst "Y."

The specimen as received by analyst "Y" consisted (as shown by his report) "of ⅝ lb. oblong loaf of corned beef together with fragments contained in large glass jar with clamp cover. Original tin container and lid were also received." Analyst "Y" reports that although "the meat appeared rather dark red in color, no unusual odor was observed." His conclusions after a considerable amount of work were as follows:

> An unidentified aerobic streptococcus of the Gamma type (Brown's Classification) was found in large numbers throughout the specimen. A gram positive encapsulated, bile soluble, green producing, lanceolate diplococcus, which is not agglutinated or precipitated by pneumococcus antisera of types I, II and III, believed to be a pneumococcus of type IV, was found in moderate numbers.
>
> Extract from meat specimen was found to contain a non-filterable (Mandler filter) substance toxic to small guinea pigs when injected in moderate to relatively large doses. . . .
>
> The toxic effects produced by this specimen are believed to be due to the presence of an endotoxin in the organisms isolated from the specimen, no soluble exotoxin being demonstrable. This substance is apparently much more toxic for humans than for laboratory

animals, although guinea pigs died following the injection of relatively large quantities of the material. Smaller quantities produced severe but non-fatal toxic symptoms in these animals.

In December, 1927, 21 months after the specimen had been opened and caused these two outbreaks of food poisoning, the writer received this specimen for examination.

From the bacteriological standpoint our findings as far as viable bacteria are concerned agree very closely with those of analyst "Y." However, none of the cultures isolated give any suggestion of toxin production even when grown in corned beef media, and since organisms of this kind are not usually associated with food poisoning, the toxicity of filtrates of the meat was more fully investigated. Repeated cultures on Endo, brilliant green, blood agar and plain agar, both from fresh emulsions of specimens taken from the central portion of the meat and from enrichment cultures after 24- to 72-hour incubation periods, failed to show organisms of the paratyphoid group. It should also be stated that all animals dying from injection of the unfiltered emulsions of this meat were autopsied and blood cultures as well as peritoneal cavity cultures were made with entirely negative results as far as paratyphoid-like organisms were concerned.

In making up emulsions of this meat for animal experimentation, approximately 20 gm. were ground in a mortar with 100 c.c. sterile water and the mixture filtered through coarse filter paper. An emulsion of this strength would surely kill guinea pigs of 250–350 gm. weight in 3 c.c. quantities when injected intraperitoneally. Heating this emulsion did not appreciably affect its toxicity, as is shown in Table I.

TABLE I

Guinea Pig No.	Weight	Amt. Injected I.P.	Previous Treatment of Emulsion	Result
X141	350	3 c.c.	—	Death in >18 hrs.
X144	300	5 c.c.	—	Death in >18 hrs.
X66	250	5 c.c.	heated 70° C. 1 hr.	Death in >18 hrs.
X57	280	3 c.c.	heated 70° C. 1 hr.	Death in >18 hrs.
X74	330	3 c.c.	heated 100° C. 1 hr.[1]	Death in >18 hrs.
?151	250	5 c.c.	heated 100° C. 1 hr.	Death in >18 hrs.

Following filtration through either a Seitz or Mandler filter the toxicity of an emulsion is markedly decreased, but such filtrates have caused death of guinea pigs following intraperitoneal injection.

The possibility of this toxic action being due to metallic substance was ruled out by a chemical examination.

The intravenous injection of rabbits with Seitz filtrates of emulsions of this meat and the titration of the agglutination power of their blood against various members of the paratyphoid group of organisms has given us an idea of the probable nature of the etiological factor concerned.

Rabbit No. V108—The normal blood showed no agglutination when titrated against the following organisms:

Cultures No. 511, 541, 542 *B. enteritidis*
526 *B. aertrycke*
509 *B. suipestifer*
501 Morgan's bacillus
512 *B. paratyphosus C*
B. typhosus
B. paratyphosus A
B. paratyphosus B

After 6 intravenous injections of increasing amounts of the Seitz filtrate of an emulsion of this meat, the serum of Rabbit No. V108 obtained 9 days after the last injection gave results shown in Table II.

This work indicates that the original infecting organism in the meat was one of the aertrycke group which had produced a heat resistant toxin.

Attempts to produce a higher titer serum were unsuccessful although a

TABLE II

	1–10	1–20	1–40	1–80	1–160	1–320
B. typhosus	–	–	–	–	–	–
B. paratyphosus A	–	–	–	–	–	–
B. paratyphosus B	–	–	–	–	–	–
B. enteritidis No. 511	–	–	–	–	–	–
B. enteritidis No. 541	–	–	–	–	–	–
B. enteritidis No. 542	–	–	–	–	–	–
B. aertrycke No. 526	++	++	+	–	–	–
B. suipestifer No. 509	++	+	–	–	–	–
B. paratyphosus C No. 512	–	–	–	–	–	–

number of rabbits were used in the trials.

This work would seem to indicate that the original infecting organism in the meat was either *B. aertrycke* or *B. suipestifer* and that the two outbreaks of food poisoning were due to a heat resistant toxin produced by this organism.

REFERENCE

1. Jordan and Falk. *The Newer Knowledge of Bacteriology and Immunology*, 1928, Chap. XXXV, p. 443.

STANDARDIZATION OF THE WASSERMANN TEST*

RUTH GILBERT, M. D., FELLOW A. P. H. A., AND ANNA M. SCHAIBLE

Division of Laboratories and Research, New York State Department of Health, Albany, N. Y.

FURTHER work was done in the standardization of antigens and complement used in the complement fixation test for syphilis. Since the fundamental basis for precipitation and complement fixation reactions is probably the same and the former test is being more and more extensively used, the comparative value of some of the more widely used precipitation tests was investigated. The results with the Kahn test, which has been given the most extensive study thus far, indicate that although it is somewhat more sensitive than the complement fixation test with the acetone-insoluble antigen, it is much less sensitive than the test with the cholesterolized antigen when the test is carefully standardized and controlled. The Sachs-Georgi and Meinicke tests which have been made are as yet too few in number to permit any definite conclusions. The reactions obtained with the Meinicke test indicate that it compares fairly closely with the Kahn test in sensitivity, while decidedly fewer reactions were obtained with the Sachs-Georgi test. No definite evidence of nonspecific reactions was obtained with any of the tests studied, if they were carefully controlled and the directions of the authors were followed in detail. The desirability of adopting a uniform complement fixation technic is urged, since aside from its chief value in increasing the accuracy of the information furnished the clinician, it would provide a standard for judging the reliability of precipitation and other tests for syphilis.

* Abstract of Referee's Progress Report for 1928 to the Committee on Standard Methods, presented to the Laboratory Section of the American Public Health Association at the Fifty-seventh Annual Meeting in Chicago, Ill., October 16, 1928.

VITAL STATISTICS

LOUIS I. DUBLIN, PH. D.

The 1927 Life Table for American Workers—In 1927 the expectation of life at birth among industrial policy holders of the Metropolitan Life Insurance Company was 56.42 years as compared with 55.02 for 1926. A large part of the gain occurred in the early ages of life. The expectation of life at age 10 for white males was 51.88 as compared with 51.41 in 1926, and 51.63 in 1925. For white females the expectation of life at age 10 was 55.32 in 1927 as compared with 54.87 in 1926. For colored males, the corresponding figures were 44.99 in 1927, as against 44.84 in 1926; for colored females 46.34 in 1927 as against 45.60 in 1926. The expectation of life at age 20 for white males was 42.93 in 1927, and 42.49 in 1926. For white females the expectation of life at the corresponding age was 46.33 in 1927, contrasted with 45.87 in 1926. Among colored males the figures in 1927 were 37.08, and in 1926, 36.80; and for colored females 38.64 in 1927, and 37.97 in 1926. At age 30 the expectation of life among white males in 1927 was 34.44, contrasted with 34.02 in 1926. Among females, it was 38.05 in 1927, and 37.53 in 1926. The expectation of life for colored males was 30.05 in 1927, as against 29.91 in 1926; and for colored females 32.15 in 1927, as against 31.41 in 1926.—*Stat. Bull.*, Met. Life Ins. Co., 9: 2 (Nov.), 1928.

Health Gains among Negroes—A study of 2,500,000 negro Industrial policy holders of the Metropolitan Life Insurance Company showed that between 1911 and 1927 the mortality rate of negroes at all ages dropped 17.3 per cent as compared with 31.6 per cent for whites. The death rate among insured negro children 1 to 14 years of age showed between 1925 and 1927 an improvement of 38 per cent over the 3-year period between 1911 and 1913. The mortality of the whites improved 43.6 per cent for the same period. Between 15 and 24 years of age the negro gain of 28.8 per cent closely approached the 31.9 per cent gain of the whites. After the age of 25 the improvement for the negroes approximated only one-half that of the whites. Between the ages 25 and 34 the negro gain was 24.2 per cent whereas that for the whites was 42.7 per cent, and between the ages of 35 and 44 the negro gain was only 18.1 per cent whereas for the whites it was 39.8 per cent.

The greatest single factor in the improvement of the mortality rate of the negroes for the periods 1911 to 1913 compared with 1925 to 1927 was the decline in the death rate from tuberculosis. While the gain for all causes combined was 17.3 per cent, that for tuberculosis was 44.7 per cent. Among the negroes the greatest decline, 156.5 per cent, occurred in the 1 to 14 year group. The decline among whites for the corresponding group was 59.2 per cent. Between the ages of 15 and 64 years where the bulk of the deaths from tuberculosis takes place, the gains for the colored ranged from a minimum of 35 per cent to a maximum of 52 per cent. Among whites for the same age group the gains ranged from 49.8 per cent to 54.3 per cent.

The tuberculosis death rate among negroes insured in the Metropolitan's Industrial Department for the first 9 months of 1928 was 233.6 per 100,000, while that for heart disease was 233.9.

The tuberculosis death rate for colored policy holders in 1911 was 2¼ times that for heart disease.—*Stat. Bull.*, Met. Life Ins. Co., 9: 3 (Nov.), 1928.

Diphtheria Survey in Connecticut—A study of diphtheria deaths was made from September, 1923, to the end of December, 1926. The study included 370 deaths out of a total of 437 for the period. Of the 370 deaths, 143 were laryngeal in type and 125 of mixed type. More than half or 53.2 per cent of the deaths studied occurred in children under 5 years of age. Seven and three-tenths per cent of the deaths were among children under 1 year of age; 31.4 per cent within the 5 to 9 year age group; and 9.7 per cent within the 10 to 19 year age group.

In only 20 per cent of the 370 cases the doctor was called on the first day of illness. In nearly 40 per cent of the cases he was not called until the fourth day or later. Antitoxin was not always given as soon as the physician was called. Less than two-thirds of the cases received antitoxin on the first day, and no antitoxin was given to 22 of the cases. Of the contacts with the 370 fatal cases of diphtheria, 44.1 per cent were immunized. Thirty-six and five-tenths were not immunized, and in 9.4 per cent of the cases it was not stated whether immunizing treatment was given.—*Conn. State Dept. of Health Report*, 1927, pp. 88–97.

Vital Statistics of England and Wales—In 1927 there was an approximate of 200,000 in the population of England and Wales. There were 654,172 births and 484,609 deaths. The infant mortality rate was 70 per 1,000 births. There were outbreaks of enteric fever which caused an increase in cases from 2,739 in 1926 to 3,533 in 1927. Smallpox increased in prevalence from 10,146 cases to 17,767. In 1926 only 1 case occurred in Wales, whereas in 1927 2,442 cases were reported. Deaths occurred among 49 persons, 35 of whom were unvaccinated. There were 67,757 cases of pneumonia for the year, which resulted in 37,242 deaths. The number of deaths from all forms of tuberculosis was 83,173 as compared with 37,525 in 1926. There were 2,690 deaths in childbirth, and 1,026 of these were from puerperal fever.—The State of the Public Health, *Brit. M. J.*, 2: 753 (Oct. 27), 1928.

Chronic Disease in Boston—A study of chronic disease in Boston was begun June 1, 1927, by the Boston Council of Social Agencies. A survey was made of 4,316 chronic and incurable patients reported by Boston hospitals or social agencies. Between July 1, 1926, and June 1, 1927, 1,863 of the 4,316 patients were in hospitals for chronic diseases, 1,043 in general hospitals and 1,410 under the care of the Community Association and other social organizations. Males totaled 46.2 per cent; females 53.8 per cent. Seventeen and seven-tenths per cent of the patients were under 15 years of age; 7.3 per cent between 15 and 29; 33.6 per cent between 30 and 59; and 41.4 per cent were 60 or over.

There were 845 cases of heart disease, which constituted about one-fifth of the total number of cases. There were 553 patients with organic nervous and mental disease; and 534 with cancer. The chronic arthritis cases numbered 467; 4.9 per cent of these cases were under 20, and 36.4 per cent under 60. The non-pulmonary tuberculosis group numbered 196; children under 14 made up about 58.5 per cent of this group. There were 138 patients with fractures and burns, and 135 with infantile paralysis. At the time of the study 85.2 per cent of the patients were known to have been ill more than 3 months, and 2,340 of the total 4,316 were ambulatory. Of the 3,127 chronic and acute

patients occupying beds in the 18 general and special hospitals on the census day, 4.9 per cent had been occupying, for more than 3 months, beds designed and maintained for acute cases.

At the time that the study was ended, 18.2 per cent of the 4,316 patients were still in hospitals; 18.8 per cent were under the care of agencies; 10.8 per cent had died; 46.8 per cent had been discharged; and the location of 5.4 per cent was unknown. Of all the chronic sick cared for by the hospitals for chronic diseases, 17 per cent were reported as full pay patients, 15.8 per cent were paying in part, and 67.2 per cent paid nothing.—Survey of Chronic Disease in Boston, Mass., 1927, *New Eng. J. Med.*, 199: 556–574; 620–632 (Sept. 20, 27), 1928.

Health Conditions in the Soviet Union—According to the census of 1926 the population of the Union of Soviet Socialist Republics was 145,806,624. In the Russian Socialist Federated Soviet Republic, one of the most important units of the Soviet Union, there was in 1925 a birth rate of 47.0 and a death rate of 25.9. This gives a natural increase of 21.1 per cent. In the White Russian Socialist Soviet Republic, another unit, the birth rate was 41.0 and the death rate 18.6, a natural increase of 22.4 per cent. In the Ukranian Socialist Soviet Republic the birth rate was 31.5 and the death rate 13.8. These figures may be compared with a birth rate of 21.4 and a death rate of 11.8 in the U. S. Birth Registration Area. The deaths of infants per 1,000 births numbered 213 in the R. S. F. S. R.; 125 in the White Russian S. S. R.; and 146 in Ukranian S. S. R. Contrasted with these is the infant mortality rate of 72 in the U. S. Birth Registration Area.

In 1925 the U. S. S. R. reported 115.2 cases per 100,000 population for typhoid fever; a case rate of 12.7 for smallpox; 450.2 for measles; 186.8 for scarlet fever; 241.8 for whooping cough; 49.4 for diphtheria; 1,957.3 for epidemic influenza; 838.6 for tuberculosis; and a case rate of 347.3 for syphilis.

No figures are available showing mortality by cause in the entire Soviet Union, but there are figures for the city of Moscow. The death rate in Moscow in 1927 was 13.5 per 1,000 population whereas in New York City it was 11.8. Moscow had a death rate of 40.8 for measles in 1927 and New York had a rate of only 0.6. There was a death rate of 19.6 from epidemic influenza in Moscow and 10.6 in New York. The rate for tuberculosis was 157.1 in Moscow, and 86.1 in New York. The rate for cancer was 101.3 in the former city and 124.9 in the latter, and the death rate from syphilis was also lower in Moscow, being 2.1 as compared with 9.2 in New York City. The death rate from puerperal causes was 27.1 per 10,000 births in Moscow, whereas New York showed the much higher rate of 51.3.—J. V. Deporte, *New York State J. Med.*, 28: 1403 (Dec. 1), 1928.

PUBLIC HEALTH ENGINEERING

ARTHUR P. MILLER, C. E.

Report of the Committee on the Collection and Disposal of Refuse *—The Committee on the Collection and Disposal of Refuse † has had insufficient time since its appointment to prepare a report of permanent value for the 1928 meeting of the Association and after due deliberation concluded it would render better service by recommending a subject for a report at the 1929 meeting to be transmitted to next year's committee after its appointment.

Several subjects suggested at first were finally believed to have been sufficiently covered in earlier reports or textbooks and others seemed better adapted to presentation in the form of a paper or address. After various interviews and correspondence the committee decided to recommend as a subject for the report by next year's committee: "The Collection of Garbage."

Progress Report of the Committee on Water Supplies *—The Committee on Water Supplies † was reorganized such a short time ago that it was impossible to take up some subject and make a report at this meeting. The chairman has been in correspondence with the other members of the committee and we have considered taking up two subjects. One is the relative portions of the burden of pollution which should be assumed by those producing pollution and by the water works or others using the water. The other is bacterial after-growths in water distribution systems. We hope to be able to report on one or both of these problems next year.

Progress Report of the Committee on Sewage Disposal *—The chairman was given to understand soon after the meeting last year in Cincinnati that not much would be expected of the committee † this year. Two brief papers, however, are offered, one by Frank Bachmann entitled "Observations on pH Control of Separate Sludge Digestion Tanks," and the second, by Harrison P. Eddy, entitled "An Account of Legal Action Brought against a Municipality for the Discharge of Filtered Sewage into a Small and Otherwise Unpolluted Stream."

The committee has been asked to suggest a line of work for next year's committee and, in compliance therewith, reports as follows:

During September and October, 1928, suggestions have been received from all the members of the committee. An informal vote upon these suggestions has resulted in a majority favoring for first choice: "The Disposal and Utilization of Sludge," and for second choice: "The Preparation of Standard Forms for the Reporting of Statistical and Operating Data."

One of the suggestions was received too late to take it up further with the committee. I am therefore submitting the above as it stands for the assistance of next year's committee.

Progress Report of Committee on Mosquito Control *—Several changes in the personnel of the Committee on Mosquito Control † were made during the past summer, and the committee did not have the opportunity to organize and conduct any investigations as a

* Presented to the Public Health Engineering Section of the American Public Health Association at the Fifty-seventh Annual Meeting at Chicago, Ill., October 16, 1928.

† Committee chairmen will welcome suggestions from members of the Section or the Association.

basis for a report at this meeting. The committee has adopted a program for 1929, which embraces the investigation of the phases of mosquito control set forth below and, subject to the approval of the Council, proposes to present, through the medium of a committee report and a special paper by someone qualified to discuss the subject selected for that purpose, those phases which have been satisfactorily developed at that time.

1. Effective and economic oil mixtures and larvicides
2. Improved practical control methods such as the use of mechanical equipment for ditch cutting and maintenance, applying oil and larvicides, etc.
3. Use of repelling agents for protection against mosquitoes on the wing
4. Publicity programs for arousing much needed individual activity in the control of breeding on private property and securing favorable action of legislative and appropriating bodies
5. Essential public health and economic values of general mosquito control
6. Variations in life habits of mosquitoes as they affect practical control

The following brief statement of the considerations which have prompted the selection of the program are given in amplification of the foregoing summary.

It is the general opinion of many experienced workers that oils now available for mosquito control purposes are not of uniform efficiency; that considerable money and time are frequently wasted on this phase of control due to the lack of knowledge of the effectiveness of oils and oil mixtures with their varying degrees of spreading properties, surface tension, toxicity, etc.; and that a product of certain selected specifications should be adopted. Much experimental work along this line has been done in New Jersey during the past year.

New methods develop from time to time. The use of mechanical equipment in several branches of control work has increased in the last two or three years. Where applicable, such equipment in its several forms is a decided economy and is worthy of study.

Knowledge of the effect of repelling agents upon mosquitoes, in the use of which freedom from attack may be obtained, would appear to be of great economic importance. The benefits of absolute protection from mosquitoes, the breeding of which for any reason is not controlled, would be immeasurable in disease prevention. Much progress has been made recently in this line of research, but no definite practice has as yet been established.

In the matter of publicity and education of the public the committee will endeavor to select or develop programs which may change indifference or hostility to active interest and support and which will demonstrate that the attitude of the public in favor of mosquito control demands that a full measure of protection be provided for by legislative and appropriating bodies.

The fifth item is linked up with the preceding one. The sixth is held to offer some practical possibilities.

Airplanes and Paris Green in Control of Anopheles Production—A description is given of the spread of Paris green by airplanes at Quantico and Chopawamsic Bays, Va. Four charts illustrate the decline throughout the summer of the production of adult anopheles in the treated localities and compare such production with that of a controlled, non-treated locality of Aquia Bay. For use in airplane dusting a dilution of 33 per cent of Paris green in powdered soapstone proved most satisfactory for all conditions. In calm weather an excellent distribution of dust was obtained at a height of 150 to 200 feet above the water. The dust penetrated all types of vegetation indigenous on the Atlantic coast.

Suitable intervals between dustings varied with the season: at Quantico they ranged from 6 to 13 days. The ma-

terials cost approximately 70 cents per acre per season. Practically any type of plane is suitable for distributing Paris green, and a simple box with sloping sides makes a suitable hopper. One plane can handle 20 square miles of breeding surface per week.—S. S. Cook and L. L. Williams, *South. Med. J.*, 21, 9: 754 (Sept.), 1928. Abstr. M. A. Barber.

Studies on the Use of Deratisation Gas for Ships—The writer outlines a series of tests which he made to determine the germicidal power of sulphur dioxide gas. *B. coli* was the organism used. Twelve silk threads were sterilized by dry heat, some were cultured as controls and the remainder were exposed to the sulphur dioxide gas. Both moist and dry threads were exposed at the same time. Two pounds of sulphur burned per 1,000 cubic feet did not affect *B. coli*. Five pounds of sulphur thoroughly sterilized the moist threads, but did not affect the dry ones.

The writer concludes that sulphuric acid gas should be used only for the destruction of rats and insects on board ship; and that the destruction of bacteria should be done by other means since five pounds of sulphur per 1,000 cubic feet is injurious to cargoes and the metal parts of ships.

A summary of 6 years' sulphur fumigation practice is given at the end of the article.—Akira Motomura, *J. Pub. Health Assn. Japan*, 4, 7: 1–9 (July), 1928. Abstr. P. S. Fox.

Blowing Odor out of Water Supply of St. Paul with Air—Aeration by compressed air over a period of 2½ years at St. Paul has reduced complaints 95 per cent (estimate) compared with 2½ years operation before aeration. Aeration adds oxygen to water and sweeps out malodorous gases. It is effected at St. Paul by air under 5 to 6 lbs. pressure delivered to the chemical mixing chamber through 2″ galvanized steel pipe with 3/16″ holes at 45° spaced 12″ c. to c. The treatment aids coagulation, saves 1 to 2 lbs. of chlorine per m.g., and removes odor at a cost of 24 cents per m.g. Air used is 6,000 to 3,000 cu. ft. per m.g. with no addition to staff for operating 50 m.g.d. plant.—Ross A. Thuma, *Eng. News-Rec.*, 101, 11: 401–402 (Sept.), 1928. Abstr. E. A. Reinke.

Bacteria Growing on Leather Packing Cause Errors in Sampling—Experience in Chicago has shown that samples of water collected from well pumps were at times contaminated by organisms growing on the pump leathers, which by ordinary bacterial tests could not be distinguished from *B. coli*.

Replacement of old type pump cylinder with specially designed metallically fitted pump cylinder solved the problem. Leather in mason jars of sterile water maintained prolific growths of organisms at times reaching as high as several million per c.c.—H. H. Gerstein, *Eng. News-Rec.*, 101, 11: 407 (Sept.), 1928. Abstr. E. A. Reinke.

Atmospheric Smoke Pollution and its Relation to Public Health—Smoke has two effects upon health, the direct effect produced by the inhalation of this material into the lungs of the exposed persons; and the indirect effect; namely, the obliteration of sunshine and its health giving rays. The author points out that city air is polluted by soot from burning coal, by gases, and by dust from the ordinary occupations taking place in the city. The two most important gases present in city atmosphere are carbon monoxide and sulphur dioxide, and it is fair to say that under ordinary circumstances both of these are present in such small concentrations that they may be considered harmless

so far as the average city dweller is concerned.

The present paper contains one of the most rational discussions of the effect of soot on the health of city dwellers with which the reviewer is familiar. To one versed in the methods of scientific inquiry it must be apparent that the proof of a question of this type is exceedingly difficult. Mr. Bloomfield's paper shows that the data and statistics so far brought forward do not permit one to arrive at a definite conclusion on this point. There is no doubt that soot is annoying, discomforting, and unesthetic, but the proof that it is actually harmful still remains to be forthcoming.

The indirect effects of smoke are really of enormous importance, but here again the proof is wanting, and for the time being, while we all are cognizant of the fact that smoke shuts off a certain proportion of sunshine and ultra-violet light, it still remains to be proved that this effect is sufficient to be called injurious to health.

The solution of the problem of smoke pollution depends on the coöperation of the mechanical engineer, the fuel engineer, and the public, according to this paper.—J. J. Bloomfield, *J. Outdoor Life*, 25, 8: 457–462 (Aug.), 1928. Abstr. Leonard Greenburg.

Air Pollution—In this brief contribution Dr. Meller reviews the progress of air pollution work in Pittsburgh, Pa. He points out that the Pittsburgh survey made in 1912–1913 by workers of the Mellon Institute disclosed the fact that the average soot fall for the city was in the neighborhood of 1,000 tons per square mile per year, of which 0.99 per cent was tar, 30.7 per cent combustible matter other than tar, 68.3 per cent ash. Following this survey an ordinance was passed regulating the production and omission of smoke. So far as ordinary buildings are concerned the essence of this regulation is that the emission of smoke of 60 per cent density (No. 3 on the Ringelmann Chart) is prohibited for intervals aggregating 2 minutes or more during any 15-minute period. One of the sections of these regulations provided a fine, not exceeding $100.00, with a 30-day imprisonment penalty for each day's violation of the ordinance.

After 10 years of operation the Mellon Institute conducted a second survey which showed a reduction of approximately 70 per cent in the tar fall, but an increase of nearly 40 per cent in the total solids deposited. Dr. Meller feels that smoke abatement in Pittsburgh, as well as many other cities, has been a success, but points out that since, in his opinion, " the greatest effects of air pollution are believed to be the suppression of the ultra-violet rays and the irritation of the mucous membrane by sharp particles of solid matter, the regulation of black smoke without controlling the other harmful constituents of furnace gases is only a partial solution of the problem." It is necessary, he adds, to consider the elimination of all solid matter and gases from products of combustion.—H. B. Meller, *Pub. Health News*, New Jersey State Dept. of Health, 13, 7: 147–151 (June), 1928. Abstr. Leonard Greenburg.

INDUSTRIAL HYGIENE

EMERY R. HAYHURST, M. D., AND LEONARD GREENBURG, PH. D.

Catarrhal Prophylaxis in Industry—The published results taken as a whole do not bear out the advertised claims of the manufacturers and venders of stock vaccines. The author tested anticatarrhal vaccines of proprietary manufacture on 79 persons, half of whom were factory staff and half clerical staff, controlled by a corresponding number of persons under exactly similar conditions of employment. In the experimental group 51 per cent developed acute coryza and only 25 per cent in the control group. There was evidence to show that those in the inoculated group were more susceptible to colds. "It would seem to follow, therefore, that the method of giving 3 inoculations at weekly intervals may actually increase the incidence of epidemic coryza," but longer intervals might decrease the same. While better results might obtain from autogenous vaccines, such are not prepared on a large scale and have limited use.—N. Howard Mummery (England), *J. Indust. Hyg.*, X, 9: 295 (Nov.), 1928.

Spray Painters in Automobile Refinishing—Author's conclusions:

Distinct physical defects attributable to benzol are very evident from this study. Of 24 men examined, 7, or 29.1 per cent, showed a blood picture of abnormally low leukocyte count; this finding was not confined to the men directly exposed to the spray. Abnormally high leukocyte count, high red blood cell count, and decreased hemoglobin percentage were also in evidence. In 5 workers, or 20.8 per cent, the spleen was palpable—a surprising percentage and a condition not before clinically reported in such an investigation. Pallor was common, though in some cases with high red counts the complexion was ruddy. Chronic bronchitis, phthisical appearance, and nasopharyngeal irritations were also in evidence. Physical appearance, length of exposure, and the presence or absence of subjective complaints are not indicative of the presence or absence of blood or physical changes or of their severity. Sprayers immediately exposed to sprays or those indirectly exposed may be affected. The blood picture and physical condition before entering this trade must always be kept in mind.

Among other things the author recommends thorough physical examinations and blood examinations every 3 months, with the exclusion of those with anemia or leukopenia, tuberculosis, chronic bronchitis, asthma, myocardial and valvular disease, nephritis or blood dyscrasia. These measures should include those even indirectly exposed. Spraying mixtures should be chemically examined for the presence of benzol. Efficient ventilation must obtain and rooms should be enclosed.—Jerome Meyers (New York City), *J. Indust. Hyg.*, X, 9: 305 (Nov.), 1928.

Some Queries about Respiratory Disease in Industry—More than half the lost time in industry is caused by respiratory disease. A brief study in the Edison Electric Illuminating Company of Boston, for the years 1915 to 1924, showed that 70 per cent of the respiratory diseases were colds and other diseases of the nasal fossae. Community studies show that this condition is not peculiar to industry but the disability varies enormously from plant to plant. The death rate from pneumonia in Akron, O., during 11 years was only 138, while in Youngstown, only 53 miles away, it was 268. The cause is evidently some unknown non-industrial factor. A number of questions arise

such as variations in the medical service supplied, the preventive health features in force, the higher temperatures or change of temperature in certain trades, such as the steel industry, etc. From studies in the cotton weaving industry, variations in humidity would not seem to be a factor, but these workers are afflicted above the average, while woolen workers in similar processes without heat and humidity exposures are afflicted below the average. In some processes the cotton workers have three times the respiratory rates prevailing in others. The study of various trades shows that the worst respiratory mortality is among those subjected to silica dust, less notably those exposed to other dust, those exposed to heat and temperature changes, and, least notably, those exposed to weather conditions. These same trades have the worst mortality from "all causes," including other diseases such as the circulatory group, digestive system, and the kidneys. It would seem that (1) hot moist processes are not nearly so productive of respiratory mortality as dusty trades; (2) pneumonia is especially bad in furnacemen, those in dusty processes, stevedores, and dock laborers. Findings of iron foundry workers by the Metropolitan Life Insurance Company are similar. For the most part the organic dusts are not so harmful as the inorganic.—R. M. Hutton (Canada), *J. Indust. Hyg.*, X, 9: 297, 1928.

Phosphorus Necrosis in the Manufacture of Fireworks—The use of the dangerous white (yellow) phosphorus without due precautions as shown in various fireworks plants in the country has enabled the author to collect the medical histories of 14 cases, descriptions of several of which are given with photographs showing the deformities present. In the three chief plants 366 persons were employed, 181 men and 185 women. Two of the 14 cases were fatal. The manufacturers themselves were experimenting for a less dangerous substitute and one advocated the prohibition in the industry of white phosphorus. Finally the resolution commending the efforts of the U. S. Department of Labor was passed January 30, 1926, by the U. S. Fireworks Manufacturers' Association agreeing to eliminate white phosphorus from the fireworks industry, the same to take effect on or before August 15, 1926. It is expected that cases of this affliction will now be eliminated. New York State is working on a code prohibiting the use of phosphorus fireworks.—Emma France Ward (Baltimore), *J. Indust. Hyg.*, X, 9: 314 (Nov.), 1928.

A Plan of Medical Service for the Industrial Worker and His Family * —The author outlines an elaborate plan undertaken by the Endicott-Johnson Corporation in the three towns in which its plants are located for lessening the disproportion between wages and the cost of medical care. The average annual wage of 30,000,000 industrial workers in the United States in 1925 was $1,250, not enough to provide for adequate medical service. The ideal plant must provide organized medical service and social service of considerable complexity and experience. It should not be arbitrary or compulsory, but competent. It must be flexible.

The Endicott-Johnson plan has been in operation and has proved practical for 15,000 workers in shoe factories and tanneries where the average annual wage is $1,441. There are 28 full-time physicians, 3 full-time dentists, 1 half-time dentist, 5 dental hygienists, 67 full-time trained nurses, 4 pharmacists, 2 bacteriologists, 2 laboratory technicians, 2 physical therapeutists, 1 roentgenologist, 6 motor ambulances, 16 clerks and

* Abstract of paper read before the Section on Preventive and Industrial Medicine and Public Health at the Seventy-Ninth Annual Session of the American Medical Association, Minneapolis, June 13, 1928.

20 other helpers; and, as occasion requires, specialists, nurses, and hospital arrangements. The service is offered to all workers and their dependents, the potential number being about 60,000 persons. The entire expense is borne by the company. "Increased individual production, and profits as the result of this plan, cover the cost."

Preventive medicine is offered in correct feeding, formation of health habits, and the use of vaccines and serums. A rest home in the country is maintained for debilitated girls and women, and a tuberculosis sanatorium at Saranac Lake, N. Y. A workers' sick relief association has 12,000 members and pays a weekly benefit of $10.50, supported with premiums of 20 cents a week. Accident hazards are kept at a minimum by careful supervision. There are no characteristic industrial hazards. Cost of the operating plan for 1927 totals $1,076,809, of which salaries amounted to $301,001, medical bills $193,480, outside service $294,586, and relief $287,742. At the rate of 2.5 cents for each of the 32,000,000 pairs of shoes manufactured by these workers the cost of their medical care can be covered.

DISCUSSION

Dr. T. R. Crowder (Chicago)—What are the difficulties that arise as obstructions on the part of the community and the local physician? Is this an economic procedure? The employe should pay at least a part of the cost. We need a study of the causes and sources of so much illness more than we need curative care.

Dr. V. S. Cheney (Chicago)—We are trying to do too much in industrial work. Other physicians must be considered. The employe should be made to look after himself. His health is what he is selling to the industry.

Dr. S. W. Welch (Montgomery, Ala.)—It is not any part of public health activities to treat the sick. Every man ought to be stimulated to take care of himself.

Dr. E. F. Cody (New Bedford, Mass.)—Has not this company had embarrassing labor difficulties?

Dr. George H. Bigelow (Boston)—This company is doing away with waste, including the waste from disease. It apparently finds it profitable to spend more than $1,000,000 per annum in this direction. It is not a question whether this system recognizes adequately the dignified position of the health officer or the dignified position of the medical practitioner; such is not disturbing the directors of the Endicott-Johnson Corporation.

Dr. W. C. Woodward (Chicago)—A knowledge should be at hand of the terms on which the medical and nursing staffs are employed; of the wages paid to employes in comparison to similar establishments; whether food, fuel and clothing are bought in bulk and issued to employes, and if not, why not, if medical service is furnished. This must be reviewed as a practical social problem. We should be told whether this is also profitable to employes and to the community.

Dr. Louis I. Harris (New York)—It is a question whether the worker is getting all the wages that he is entitled to. Under a system of medical care such as the one outlined, there is not the slightest danger of pauperization when the average wage is only a little more than $1,400 among 15,000 employes. Still are they getting an adequate wage? The plan is one of the varied experimental efforts to compensate for the lack of an adequate system of general medical service, because thus far a statesmanlike approach has not been made to this community problem. The questions should be dealt with in a socially minded way.

Dr. Daniel C. O'Neil—I expected the announcing of this plan here to start something. The worker whose average

wage is only $1,200 for the maintenance of a family is practically pauperized. Our scheme is not compulsory and a limited number of our workers do not avail themselves of the service, and they are not discriminated against. Our average wage below the rank of foreman last year was $1,441. The average wage paid to workers in the shoe industry in general in 1925 was $950.00. We do not furnish food, fuel, rent, and clothing in a wholesale manner, but only to those who suffer misfortune and need such assistance. Likewise our medical service is only for those who need it and who ask for it. Reference is made to the vital statistics of our communities which are in the office of the New York State Department of Health. I recall that our birth rate is nearly double that for upstate New York. Our relations to local physicians and the community are satisfactory and mutually helpful. Medical charity is lifted from them. Opportunity to receive postgraduate instruction is provided.—Daniel C. O'Neil (Binghamton, N. Y.), *J. A. M. A.*, 91, 20: 1516 (Nov. 17), 1928.

Near Vision and Illumination in Industry—Defective products should be charged to (1) raw materials, (2) mechanical factors, and (3) the human factor. Secretary Hoover's Committee on the Elimination of Waste in Industry reported large loss when the eyes are not given proper care. The most vital factor in this is light. The Travellers Insurance Company reports that 24 per cent of 9,100 accidents were caused directly or indirectly by improper lighting. More than 50 per cent of our population suffer from defective vision. More than 25,000,000 are involved in industry. We have found that 18.7 per cent of workers between 22 and 60 years have defective near vision. Eye fatigue can be practically eliminated by proper lighting and correction of refractive errors in the eyes. The efficiency of the individual is increased when 20 minutes rest time is allotted, and the quality of the work may be increased as high as 100 per cent. Our present analysis covers 16,000 employes and the accompanying charts are self-explanatory. Ten to 12 foot candles of light are thought to be the best illumination for close work. Corrected vision and illumination decrease accidents. Lighting should be free from glare and have enough intensity to produce the greatest visual acuity without fear of eye strain, and with short rest periods.—In the discussion, Dr. A. L. Brown said that poor illumination produces muscular imbalance (of the eyes) and is probably responsible for more distress than errors of refraction. Intensity of illumination should vary with the color of the material worked upon, white reflecting from 50 to 70 per cent of light and black only from 2 to 5 per cent.—P. A. Davis, *Ohio State M. J.* (Nov.), 1928, 6 pp.

Legislation on Occupational Diseases in Bolivia—The law passed April 18, 1928, covers (among other needs) various poisons and pathological conditions such as pneumonoconiosis, anthracosis, hydrocarburism, tobacco poisoning, pulmonary sclerosis, nephritis, and pulmonary tuberculosis, which are considered as occupational diseases. Compensation is paid (1) when the disease is contracted in the exercise of the occupation; (2) when the disease is due to the type of work done by the patient during the year preceding disability; (3) when the worker had not suffered from the disease before employment. Those who are principally exposed to pneumonoconiosis will be entitled to 30 days' annual holiday with full pay.—International Labor Office (abstracted from *Monthly Labor Review*), *U. S. Bur. of Labor Statistics*, 27, 5: 67 (Nov.), 1928.

FOOD, DRUGS AND NUTRITION

WALTER S. FRISBIE

Investigation of the Anti-Bacterial Resistance of Rats with Experimental Rickets—References are given of the observations of previous workers as to the lessening of the resistance toward infection in the case of vitamin deficiency. This investigation was undertaken for the purpose of measuring as specifically as possible the actual degree of resistance to known infection in the case of rats with experimental rickets. The rats, 30 to 35 days old, were placed on the McCollum 3143 diet, slightly modified by the authors, for 5 to 7 weeks. The diet was sufficient in vitamin A and the lack of balance between the calcium and phosphorus was made up by adding monocalcium phosphate in measured amounts. The infection was a strain of *B. suipestifer* introduced by intraperitoneal injection. The minimum lethal dose of this organism was determined both on normal rats and on those with experimental rickets, in the first case being between 22 and 24 million germs and in the latter about 3 million per gram of body weight. The authors showed at the outset that cod liver oil and irradiated sesame oil added to the rachitic diet increased the bacterial resistance. As controls, rats were used on the McCollum diet alone, on a rachitic diet with sesame oil irradiated, and finally normally fed rats. The sesame oil was irradiated by the Bach "Höhensonne" in a layer 1 mm. thick with the lamp at a distance of 30 cm. A number of tables are given showing the results with the different additions to the diet in varying percentages and in combination. The various experiments afford the conclusion that the anti-bacterial resistance of white, normal growing rats toward *B. suipestifer* is 7 to 8 times greater than the resistance of rats of the same age which have been made rachitic by the McCollum diet. The resistance of the rats with experimental rickets can be raised three to fourfold by the addition to the rachitic diet of 3 per cent sesame oil irradiated an hour with the "Höhensonne," or by the addition of 3 per cent cod liver oil. With the addition of 6 per cent sesame oil irradiated for an hour, or 3 per cent irradiated 3 hours, a further increase of the anti-bacterial resistance is not achieved. The anti-bacterial resistance is not increased or cannot be detected when the phosphate deficit in the diet is restored, by irradiation of the rachitic rats with the "Höhensonne," or by a fast of four days' duration. By irradiation normally nourished, growing rats do not show any increase in anti-bacterial resistance compared to normal rats of the same age not irradiated.—Dr. E. Maurer and Dr. P. Hofmann, *Arch. f. Hyg.*, 100, Band 8. Heft, 1928, p. 25.

The Presence of Arsenic in the Fish Organism—In arsenic poisoning the greatest amounts of arsenic are found in the liver and the kidney. In the ordinary articles of the diet, only fish contain arsenic in sufficient amounts to be definitely determined. The Swedish Arsenic Commission found the cod contained from 4.1 to 0.5 mg. of arsenic per kg. of body weight and the herring 0.4 to 0.8 mg. The authors sought to determine whether in the case of fish the arsenic is present in greater amounts in the liver than in the muscle tissue as is the case in human poisoning. In two

experiments on the cod, there was present in the liver 0.7 and 3.2 mg. arsenic per kg. and in the kidney 0.4 and 0.8 mg. per kg., indicating the preponderance in the liver. To determine whether the arsenic exists in the fish or the oil of the fish, raw cod liver was analyzed as well as the alcoholic extracts. Cod liver oil yielded 3.9 mg. per kg. of arsenic and the alcoholic extract contained 44 mg. per kg., the fatty acids of the alcoholic extract 250 mg. per kg. and the alcoholic extract ot the residue after vacuum distillation of the fatty acid yielded 1,000 mg. per kg. The muscle tissue of the eel exclusive of certain organs was examined but arsenic was found in such minimal amounts as to warrant no definite conclusion. The muscle tissue of the herring yielded 2 mg. per kg. of the arsenic and the material of the ether extract 9 mg. per kg. The conclusion is reached that the arsenic is normally present in the fat soluble combinations. These are soluble in the usual fat soluble media but with difficulty soluble in water. The concentration of arsenic is greater in the liver of fish than in the muscle tissue. Also the arsenic is present in the oil separated from the muscle tissue and obviously in greater concentration in the extracted oil than in the tissue residue. It may be ascribed to the dissimilar composition of the food of these fish. A discussion is given as to the probability of the combination of the arsenic in the organism of poisoned mammals. According to Heffter there are three hypotheses, the lecithin hypothesis in which arsenious acid is supposed to substitute the phosphoric acid of lecithin; the nuclein hypothesis in which arsenic in a corresponding fashion is supposed to substitute the phosphorus of nucleic acid, and the keratin hypothesis which derives its name from the fact that arsenic is partially eliminated by the nails and hair. Comparison of the records of the presence of arsenic in the case of poisoned mammals and its presence in fish as found in these experiments has led to the conclusion that in the two classes the relationships are dissimilar.—Erik Sadolin, *Biochem. Ztschr.*, 201, Band (Nov.), 1928, p. 323.

Vegetable Food as a Source of Iodine—The very close correlation between the distribution of iodine and the existence of goiter in the United States has prompted a study of some of the vegetable foods in South Carolina, which is practically free from goiter. Investigations so far conducted on vegetables grown in this state indicate that they contain enormous amounts of iodine. Fellenberg reports the amount of iodine necessary to maintain equilibrium in a man is 14 micrograms. Some of the South Carolina potatoes contain enough iodine in a single four-ounce potato to furnish the 14 micrograms. The leafy vegetables are also rich in iodine, beet tops and lettuce running as high as one thousand parts per billion.—Roe E. Remington, *Science*, 68: 590 (Dec. 14), 1928.

Protein and Vitamin B—Reports of investigators as to the varying tolerances of experimental animals to high protein diets suggest that the unfavorable effect observed by some is not due to that factor alone but to the deficiency of some factor or lack of balance. The relation between protein and vitamin B is suggested. Experiments were conducted with rats on a basal diet of edestin, potato starch, butter, salt mixture and distilled water, with no restrictions on the amount of food and water consumed. Rats were weighed daily for the first 4 weeks and afterwards 5 days a week. Experiments are recorded in which this basal diet was supplemented with varying amounts of marmite and growth curves are given both for the experimental rats and those in which the protein was caseinogen or egg-albumin. The results show that the

20 per cent edestin diet with the 5 per cent yeast extract per 100 gm. solid was responsible for the death of many young rats with kidney symptoms but that the older rats were not affected. The symptoms can be prevented by the addition of more yeast extract and the protective factor in this extract is not destroyed by autoclaving at 120° for 4½ to 5 hours. Somewhat less yeast extract is necessary when caseinogen or egg-albumin is substituted. It is suggested that the different proteins may require varying amounts of vitamin B in order to secure proper metabolism.—Gladys Annie Hartwell, *Biochem. J.*, 22: 1212, 1928.

The Effect of the Cow's Ration on the Vitamin A and Vitamin B Content of Milk—Comparisons were made from milk of cows on both a high and a low protein ration. The high protein ration had a nutritive value of 1 : 2 and the low protein ration a nutritive ratio of 1 : 13. To determine the vitamin A content, young albino rats were fed on a vitamin A deficient diet until loss of weight occurred and the diet was then supplemented with milk from each of the groups of cows. Two c.c. of milk caused the resumption of growth in each case and 8 c.c. restored excellent growth. Vitamin B was tested similarly on rats and it was found that 15 c.c. of milk from normal cows and 16 c.c. from high protein cows and 18 c.c. from low protein cows permitted uninterrupted growth over an 8-week period. While the differences are small, the conclusion is reached that the milk from low protein cows contains less vitamin B than that from either the high protein or normal cows. While some recent experimental work has indicated that the presence of vitamin B in milk is not dependent upon the ration but is manufactured in the cow's paunch, the author concludes that this activity is influenced by the feed consumed and this may explain the difference in vitamin B content in this test. It is apparent, however, that a cow can tolerate a very low level of protein feeding without materially affecting the vitamin A and vitamin B of the milk.—W. E. Krauss, *Ohio Agri. Exper. Sta. Bull.*, No. 135 (Nov.–Dec.), 1928, p. 198.

CHILD HYGIENE

MERRILL E. CHAMPION, M. D.

MATERNAL AND INFANT MORTALITY*

JULIUS LEVY, M. D., FELLOW A. P. H. A.

Bureau of Child Hygiene, State Department of Health, Trenton, N. J.

I. INFANT MORTALITY

MORTALITY UNDER ONE MONTH IN PRINCIPAL COUNTRIES

When charted several interesting features are indicated. In the first place, we see that the neonatal mortality varies considerably among the great countries of the world. This fact in itself is probably the most important fact to be brought out, for if it varies considerably, we are justified in believing that it is in our power to influence and to some extent control the neonatal mortality.

The United States with a neonatal mortality rate of 37.8, while not among the countries with the very highest neonatal mortalities, is to be found, however, among the upper third highest neonatal mortality rates. Attention is called to the low rate reported for Netherlands, 23.6. Similar rates are reported for New Zealand, Irish Free State, Australia, Denmark, and Belgium, all of which present neonatal mortality rates below 30. The rate for the United States is more than 50 per cent higher than that for Netherlands.

Another factor may be emphasized that we hope the committee will be able to clarify. The country with the lowest neonatal rate appears to be Egypt. From our general knowledge of conditions in Egypt, we are not disposed to believe this rate to be correct, and yet it must be included in this report, as it is based upon the official available statistics. We hope in the next report to be able to point out whether this fact is a true one and one to be used in comparison with the other countries.

I might mention here that when we come to discuss the maternal mortality we will find that the same countries which present a low neonatal mortality present a low maternal mortality. Apparently those factors which make for a high maternal mortality at the same time make for a high neonatal mortality. I would immediately make the deduction that any attempt to reduce neonatal mortality will have to deal with the problem of obstetrical care.

TREND OF INFANT MORTALITY

There has been practically no reduction in the mortality under 1 day since 1918. As a matter of fact, statistically there has been a slight rise.

When we take the mortality under 1 month for the same period, we find a percentage fall per year of 1.6, which is a very slight decrease. The reduction in the infant mortality under 1 year has really occurred in the period between 1 month and 12 months, a percentage fall per year of 5.7.

* Abstract of Report of the Committee to Report on the Status of Maternal and Infant Mortality, presented at a Joint Session of the Child Hygiene and Public Health Nursing Sections of the American Public Health Association and the American Child Health Association at Chicago, Ill., October 16, 1928.

Again, the fact is emphasized that the methods which have been found effective in reducing infant mortality apparently have had and will have very little effect upon the *early* infant mortality. Now, as it appears that the mortality in the first month of life, and particularly the first week of life, is a large proportion of the total mortality in the first year, it will become clear that any hope of further reducing infant mortality must be found in the efforts that will be directed to this early period.

INFANT MORTALITY BY MONTHS OF AGE IN THE FIRST YEAR OF LIFE

Here is shown the importance of the mortality in the first month. We see that the mortality in the first month, which is 37.9, practically equals the mortality of the succeeding 11 months.

AGE FACTOR IN INFANT MORTALITY

Half of the deaths of the first year occur in the first month, and half of the deaths of the first month occur in the first day, and half of the deaths in the first day occur in the first 3 hours. Therefore, it is very clear that no method of distributing modified milk, establishing mothers' classes, and visiting new-born babies can have a very marked effect upon this mortality, as it is obviously bound up with the obstetrical problem.

INFANT MORTALITY BY HOURS OF THE FIRST DAY OF LIFE

It is clearly evident that if we are going to reduce further infant mortality, we must reach the causes that are effective in the first 24 hours, for in this period one-half of all the deaths under 1 month occur and practically 15 per cent of the deaths under 1 year.

In passing, I would mention that there has been a recent tendency to separate prenatal work from general child hygiene and the infant mortality problem. I believe those who feel responsible for infant life must deal with the prenatal and obstetrical problem.

FIRST DAY'S MORTALITY BY TYPE OF ATTENDANT AT DELIVERY

We find that the mortality in the first day for babies delivered in hospitals was three times as great as for those delivered at home; that the mortality for infants delivered by internes was twice as high as for those delivered by private physicians in hospitals; that among babies delivered at home the mortality for those delivered by physicians was almost twice as high as for those delivered by midwives; that for the entire group the mortality for those delivered at home by midwives was 5.6, while for those delivered in hospitals it was 21.8. Immediately these data present several questions for further study.

Is this high mortality among infants delivered by physicians, and particularly those delivered in hospitals, a coincidence or is there a definite relationship? Is the lower mortality found among infants delivered by midwives and in the home determined by the type of case and the type of woman who comes into the hands of the midwife, or is it due to the greater patience exercised by the midwife? Does the mortality among infants in the first day vary considerably according to the order of pregnancy? What conditions may be obtaining in hospital practice that would explain this very high mortality?

CHANGE IN SEASONAL INCIDENCE OF INFANT MORTALITY

Here we find that in the period, 1913–1914, a very high peak of mortality appears in July and August. When we contrast with this the mortality in 1926–1927 we find not only a complete disappearance of this peak, but a valley, so that it would appear an infant is safer in the summer months now than in the winter months.

RESPIRATORY DISEASES VERSUS DIARRHEA AND ENTERITIS IN INFANTS

We are able to point out that the great reduction of the summer mortality in the past decade is due to a lessening of summer diarrhea. In 1915–1916, summer diarrhea represented 23.5 per cent of the total deaths under 1 year, while in 1925–1926 it represented only 13.7 per cent. As diarrhea occupies a less important place in the mortality of the first year, the respiratory diseases rise in importance but only to a very slight degree. Recalling what has been said about the neonatal mortality, it becomes clear that the mortality of the first year is now mainly due to the diseases associated with the neonatal period.

II. MATERNAL MORTALITY

DEATHS PER 1,000 LIVE BIRTHS

A study of maternal mortality throughout the world shows that the United States presents the second highest mortality for all puerperal conditions and the fourth highest for puerperal sepsis. In contrast with the rate of the United States, which is 6.7 for all puerperal conditions, we would call attention to Netherlands, Norway, Sweden, and Italy, which present rates below 3 per 1,000 live births.

PUERPERAL SEPSIS MORTALITY

There is some encouragement to be found, however, in the study of maternal mortality, in the fact that for a considerable number of states there has been some decline in the past decade in the maternal mortality due to puerperal sepsis. Connecticut, New Hampshire, Vermont, and the District of Columbia have shown an increase.

It is particularly interesting to point out that this reduction of puerperal sepsis has been found also among the colored in Virginia, Maryland, North Carolina, and Kentucky with, however, an increase in the District of Columbia.

IS MATERNAL MORTALITY DECLINING?

We find that the maternal mortality, while showing a decline from 1917 to 1921, has practically remained constant for the past 4 years. Studied by special diseases, we find that there has been a percentage fall per year of 1.4 for puerperal albuminuria and convulsions for the past decade, and a percentage fall of 1.3 per year for puerperal sepsis.

There has been no decline in the past five or six years in maternal deaths from other causes and in one or two there seems to be an increase. Accidents of labor, which are definitely associated with obstetrical care, show a fall for the first 4 years of the decade but practically no fall since 1921. The same is true for accidents of pregnancy and all the other puerperal conditions with the exception of albuminuria and sepsis.

These facts again, when combined with the high mortality found in the first days of life, must direct attention to the question of obstetrical practice. Has there been an increase in the application of forceps, in the use of general anesthesia, in the administration of pituitrin, in general operative interference? May not these tendencies of modern life be the cause of our failure to obtain a reduction in the maternal mortality and in the neonatal mortality, and may not these practices offset the greater attention and care which is being given to the expectant mother or to the woman in the hospital?

PERCENTAGE OF SPECIFIED CONDITION IN TOTAL PUERPERAL MORTALITY

The facts are very clearly brought out when we see that contrasting 1926 with 1917 shows a reduction in puerperal sepsis, a very slight reduction in puerperal albuminuria and convulsions, and an actual increase in the accidents of pregnancy, the accidents of labor, and other puerperal conditions.

PUERPERAL MORTALITY IN URBAN AND RURAL AREAS OF NEW YORK STATE

The puerperal sepsis rate in the urban sections of New York State was more than twice as great as that in the rural sections and there was practically twice as high a mortality in all the other conditions in the urban area as in the rural.

A very interesting fact, too, is that when we consider the percentage fall per year in the death rate for this same period we find that in the urban area there was a percentage fall per year of 0.9 for puerperal sepsis with practically five times as great a fall for the rural area. For all other puerperal conditions the percentage fall has been very similar for urban and rural areas. These data are of particular importance because for purposes of this study the rural area included only communities with populations under 2,500.

PERCENTAGE BIRTHS DELIVERED IN HOSPITALS AND BY MIDWIVES

An attempt was made to study the relationship of hospitalization to maternal and early neonatal mortality. We find that in Minneapolis in 1914, 23 per cent, and in 1927, 78 per cent of the women were delivered in hospitals. This fact is generally looked upon as an evidence of real progress in the care of mothers and a practice that should lead to a marked reduction in maternal and neonatal mortality. However, there has been no reduction in the deaths in the first day of life throughout this period, there has been no reduction in deaths from puerperal sepsis, and there actually has been an increase in deaths from injury at birth. Some 12 cities were examined in regard to similar data and similar information has been obtained.

In Newark, N. J., a very similar situation is indicated. We have been able to include the percentage of women delivered by midwives, and we find that during the period the percentage of women delivered in hospitals has increased from 12 per cent to 50 per cent, and the percentage of women delivered by midwives has decreased from 50 per cent to 23 per cent. The deaths associated with puerperal sepsis have practically been constant. The deaths in the first day of life have shown a slight increase and the deaths associated with injury at birth, which, also, have shown a slight increase, present curves practically identical with those for Minneapolis.

We believe that it is very important to present these facts, so that they may stimulate further study and analysis. Some have intimated that the reason for not obtaining a reduction in puerperal sepsis in those cities which show a high percentage of hospitalization is that the better results obtained in the hospitals with full term deliveries are offset by the great increase in sepsis associated with criminal abortion. We believe that this should be thoroughly investigated to find out if it is an adequate explanation for the rather disappointing results. I think, however, that we are justified in saying that these facts must give pause to anyone offering general hospitalization as a solution to the maternal mortality problem.

NOTE: It will be recalled that at the Annual Meeting of the American Public Health Association in 1927, following a paper by Lee K. Frankel, Ph.D., on the Present Status of Maternal Mortality in the United States, a committee of the Child Hygiene Section of the Association was appointed to carry on studies on maternal and infant mortality. The paper abstracted here, largely in the words of its author, Julius Levy, M.D., chairman of the committee, is the first report of the above mentioned committee.

A more complete report accompanied by some of Dr. Levy's charts will be found in the *Transactions of the American Child Health Association for 1928.*

PUBLIC HEALTH NURSING

MIRIAM AMES, R. N.

The Passing of Miss Maxwell—Numbered among the pioneers of the nursing profession was Anna C. Maxwell. Her pioneer spirit was repeatedly manifested to her associates during a career of usefulness and interest. Miss Maxwell had characteristics which marked her as a unique and unusual personality. She was well known and well beloved.

In recognition of her services during the Spanish-American and World Wars, Miss Maxwell was given the honor of full military burial in Arlington National Cemetery on January 7.

Instruction on Ventilation—Over and over we have heard that sleeping with windows open is imperative. But we know that fresh air is needed all of the time. The new science of air hygiene now teaches a new technic in ventilation. The first requisite of fresh air is that it be of moderate temperature, so as to keep the surface of the body comfortably cool. [The author does not explain how this can be accomplished in summer.] The health temperature is 68° F. or a little below. The second requisite is gentle motion of the air without drafts. A moderate humidity is likewise essential.

In cool, moving air, the body feels comfortable and stimulated. Overheating prevents the most efficient functioning of mind and body. Colds occur more frequently in persons living in overheated apartments. The temperature should never rise above 68° F., except for old people and invalids.

Sleeping rooms should be much cooler than other rooms, but it is not necessary to maintain an outdoor temperature in bedrooms in winter by sleeping with all of the windows open. "If the sleeping room is unheated and the night is very cold, there will be, without much, if any, window opening, sufficient leakage of air around the windows to provide freshness, unless several persons are sleeping in the room." On the other hand, it may be possible to sleep in a room with the windows open and still not have a sufficient supply of air, because the bed may be so far from the window. Usually in climates where the temperature does not go below zero, some opening of the windows is necessary.

The proper place for emphasis in consideration of the new air hygiene is on coolness of air rather than on open windows, as such.—Thomas D. Wood, M.D., and Ethel M. Hendriksen, What the Clinic Should Teach about Ventilation, *Am. J. Nurs.*, 28, 9: 890 (Sept.), 1928. B. J. B.

The Newton Bill (H. R. 14070)—This bill makes provision for the continuance on a national scale of the work now carried on under the Sheppard-Towner Act (Terminates June, 1929). It provides for federal coöperation with states in reducing maternity and infancy death rates, and does *not* demand that state funds be appropriated to match federal funds.

An advisory committee to the chief of the U. S. Children's Bureau is created. Five non-governmental members may be appointed—experts in child welfare and child health—one a health officer appointed from the membership of the Conference of State and Provincial Health Officers.

An Uncompleted Gift—In memory of the nearly 300 American nurses who died during the World War, their compatriots in the same profession contributed $51,000 to house the Florence Nightingale School of Nursing at Bordeaux, France. It was planned to have a central building with two wings. The cost of construction increased so much, however, that it was necessary to omit the erection of one wing. It stands today incomplete. But it is not so to remain. The House of Delegates of the American Nurses' Association at the meeting in Louisville, Ky., in June, 1928, voted that $25,000 should be raised to build the necessary wing. The campaign for the funds, conducted through the state associations, began November 1, and will be officially terminated before the International Council of Nurses meeting in Montreal, Can., in July, 1929, when it is hoped that the amount can be given to a representative of the Bordeaux school.—Virginia McCormick, A Gift is to be Completed, *Am. J. Nurs.*, 28, 12: 1221 (Dec.), 1928.

Health Survey of New Haven, Conn.—The recent study of New Haven's health resources, accomplishments and needs, which was conducted by C-E. A. Winslow, Dr.P.H., during the past year, is outstanding partly for its completeness and partly for the reason that it follows another study made 10 years ago by the same expert appraiser; and it has all the advantages of perspective and appreciation of obstacles overcome and progress made.

It is now revealed that more than three-fourths of the specific recommendations made in 1917 have already been carried out. A few of the remaining are no longer applicable under changed conditions, and others are under consideration. Such a record of accomplishment, together with the request for this second check-up of community needs before going on, indicates an unusually active and forward-looking attitude toward health which motivates the work of the different health groups in New Haven. The result is, in the opinion of Dr. Winslow, that New Haven promises soon to have the most perfect community health machinery in proportion to its size in the United States.

The survey covers all phases of the community health program, including dispensary and hospital service, visiting nurse service, tuberculosis, school and child welfare nursing, industrial hygiene, social hygiene, health education, sewage disposal, water and milk supply, housing, etc. In the special field of public health nursing, the study was made by Gertrude E. Hodgman, R.N., Yale School of Nursing, and Katharine Tucker, R.N., General Director of the Visiting Nurse Society of Philadelphia. Michael M. Davis, Ph.D., conducted the survey of hospitals and dispensaries. Recommendations for social hygiene were made by William F. Snow, M.D., General Director of the American Social Hygiene Association.

Dr. Winslow summarizes the general ideal toward which efforts in health work should be directed as

> . . . the development of the Health Department as the center for all directive and supervisory health functions; the Visiting Nurse Association as the center of all home nursing service (aside from such functions as communicable disease control); and the New Haven Dispensary as the center of outpatient clinic service (other than conferences for normal mothers and babies).

Specific steps to be taken to lead toward this goal are suggested.

1. The transfer from the Visiting Nurse Association to the Health Department of all responsibility for appointments of conference physicians.
2. The coördination of home service of the Visiting Nurse Association and the Health Department through the transfer of the duties of the present Board of Health Welfare Nurses to the nurses of the Visiting Nurse Association, just

as tuberculosis work has already been transferred. Provision of an annual grant from the Board of Health to the Visiting Nurse Association for maintenance of this work is recommended.

3. The development of venereal disease clinic service in conjunction with the New Haven Dispensary polyclinic service; appropriate financial contribution to be made by the Board of Health for that service.
4. The extension of the services of the Crippled Children's Aid Society so as to be available for patients of all orthopedic physicians.
5. Closer coöperation between the Visiting Nurse Association and the nurses of the Queen's Daughters, so that the latter may give more individual service to chronic and convalescent patients and the acutely ill may be transferred to the visiting nurses.
6. The development of a Council of Community Nursing under the leadership of the Visiting Nurse Association for the purpose of promoting sound growth in the future.

Certain additional expenditures of money are recommended to the Community Chest for the improvement of health facilities, among them being the development of a social service department in the New Haven Hospital and Dispensary, a mental health supervisor for the Visiting Nurse Association, additional nurses to meet increase in population, establishment of a cancer clinic, consideration of some provision for occupational therapy and facilities for the hospitalization of chronic and convalescent patients.

It is the opinion of the author that future developments in health work through the Health Department can be wisely carried out only with adequate financial provision, and a substantial increase in the appropriation for this department is recommended. The transfer of the Division of Vital Statistics to the Department of Health is urged, whereby detailed studies of morbidity conditions may be carried on. Expansion of the Health Department work should be made to provide more thorough school examinations, more comprehensive venereal disease educational and curative work, more popular health instruction and further assistance to relieve the Health Officer of routine inspections.

Haven Emerson, M.D., in a brief comment in the November 15 *Survey*, speaks of Dr. Winslow's survey as "New Haven's health examination" and describes it as the most complete, enlightening and constructive study that has yet been made for any city of its size.—C.-E. A. Winslow, Dr.P.H., *Health Survey of New Haven, 1928.*

K. E. P.

Intracranial Hemorrhage of the New-born—Throughout the length and breadth of the land, health workers are viewing with satisfaction the gradual and appreciable decline in the infant mortality rate during the first year. Dr. Benjamin P. Burpee's paper in the *American Journal of Nursing* forces upon the attention of public health nurses the fact that there is need for more and more watchfulness and keen observation on their part if the death rate among infants in the first month of life is to be lowered still further. To quote Dr. Burpee,

> The most fertile field for lowering the infant death rate under 1 year, at the present time, lies in the reduction of deaths that occur in the first week of life from the condition known as intracranial hemorrhage.

Intracranial hemorrhage is the cause of nearly half the deaths of babies under 2 weeks, and 100,000 babies under 1 month die each year in the United States. Hemorrhage within the cranial cavity is more readily recognized than it used to be, and better diagnosis reveals it as a more frequent complication than was formerly supposed. Early recognition and proper treatment play important rôles in curing the condition and preventing the sequelae.

According to Dr. Burpee, the public health nurse need not be either a practitioner or a diagnostician in order to

recognize the condition immediately so that it may be reported to the attending physician. Intracranial hemorrhage differs from hemorrhagic disease. In the latter, there is a definite increase in both the bleeding and coagulation times. Transfusion should be done both to aid the clotting and bleeding times of the infant's blood and to replace the blood that has been lost by external bleeding. In cases of intracranial hemorrhage only the coagulation increasing elements of the blood are needed. Hemorrhagic disease should be thought of as an entity and as one of the predisposing factors toward intracranial hemorrhage; the other two are asphyxia and trauma.

PREDISPOSING FACTORS WHICH PRODUCE HEMORRHAGE

Trauma—This is probably the greatest single factor; it is the actual laceration of some of the blood vessels within the cranium, resulting in the extravasation of blood somewhere within the brain substance, on the surface of the brain, or within the ventricles. The death rate from intracranial hemorrhage is higher in the first-born and higher in males which average a larger size.

Prematurity—When the blood vessels are not fully developed, they are more easily ruptured.

Syphilis—This is important only in so far as it tends to cause prematurity.

Maternal Toxemia—This tends to make the fetal blood vessels more easily ruptured.

Asphyxia or Congestion and lastly *Hemorrhagic Disease* of the new-born.

ETIOLOGY

Too little is known about the etiology of intracranial hemorrhage, but it is not always due to poor obstetrics since many cases occur in easy, normal, spontaneous deliveries. Trauma is the chief cause although it is often beyond the control of the physician. The use of forceps properly applied does little damage. It is questionable whether pituitrin can cause the hemorrhages by causing too rapid passage of the head through the cervix. It is also logical to suppose that a toxin circulating in the blood of the mother may make the fetal blood vessels more friable.

Some authorities contend that cases of intracranial hemorrhage are infectious and indeed have rather convincing evidence to substantiate their arguments. It is believed that anesthesia plays an unimportant rôle, if any, in the causation of the disease. Obstetricians agree that it is unwise to deliver the fetal head and leave the body in utero since the difference in the two pressures causes an asphyxia and thus may tend to produce hemorrhage. Breech presentation occasionally causes hemorrhage and in combination with prematurity is particularly dangerous. Precipitate labor figures largely because of the rapidity with which the fetal head is pushed through a not completely dilated cervix.

SYMPTOMATOLOGY

Every nurse should familiarize herself with the symptoms of intracranial hemorrhage. The symptoms are not always the same, but there are certain ones which are readily recognizable.

1. *Cessation of normal nursing*—This is the most important single symptom. A new-born infant who is nursing well for the first two or three days and then cannot be made to nurse should be subjected to careful medical inspection.

2. *General attitude of child*—It may be either very restless and crying all the time with a shrill cry suggestive of meningitis if the hemorrhage is on the hemispheres, or it may be very limp and not cry or open its eyes if the hemorrhage is below the tentorium.

3. *Color*—The infant may be pale or cyanotic, again according to the location of the hemorrhage.

4. *Pulse*—The pulse may be either

rapid or slow, from exhaustion or irritation of the vagus nucleus.

5. *Temperature*—This frequently varies from between 103° and 104° to normal or subnormal. Probably the high temperature denotes dehydration.

6. *Respiration*—Difficulty with respiration is a frequent symptom and may even be fatal due to pressure on the respiratory center.

7. *"Continual complaint" or restlessness.*

8. *Cerebral irritation*—This is manifested by twitching of the hands and feet, dysphagia and even convulsions.

9. *Paralysis*—Usually this is a last symptom.

Vomiting and hemorrhages in other parts of the body are other symptoms.

TREATMENT

This consists of two procedures; 20 c.c. of whole blood should be given intramuscularly in varying doses until the symptoms subside. This is a perfectly safe and simple procedure.

Lumbar puncture is performed for the purpose of relieving the pressure within the head. It is the pressure, resulting from the hemorrhage, which causes death. The puncture should be performed every 8, 12, or 24 hours.

SEQUELAE

If the hemorrhage is severe, death takes place rapidly. If the infant survives without having had proper treatment, Little's disease, spastic paralysis, idiocy or feeblemindedness may result in later years, as well as certain types of epilepsy. The early recognition of cases cannot be stressed too greatly.—Benjamin P. Burpee, M.D., Intracranial Hemorrhage of the New-born, *Am. J. Nurs.*, 28, 12: 1183 (Dec.), 1928.

Correspondence Course in Public Health Nursing—A correspondence course in public health nursing given by the University and Bellevue Hospital Medical College, New York, N. Y., in coöperation with the New York State Department of Health is enrolling students for the 1929–1930 courses. The course consists of 25 lessons of 10 hours each, and a residence week of study at one of the large medical centers of New York State is required as a part of the course. The first lessons of the course will be ready for distribution to matriculated students March 1.

EDUCATION AND PUBLICITY

EVART G. ROUTZAHN*

Health Appeal in Advertising—The battle royal now on between the competing anti-fat advertisers accentuates the whole problem of health education in various forms by commercial firms. December 8, 1928, the *Journal of the A. M. A.* reviewed the situation as to space advertising. The use of posters and other educational printed matter supplied from commercial sources calls for thoughtful, searching discussion in public health journals and conventions.

One-in-two at Chicago—Devoting the two main sessions of the Public Health Education Section to one theme was quite a success. The new subject of program planning was fortunately presented by a group of speakers with a high batting average. Doubtless de-

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

tailed reports will appear in the *Journal*. The group of program outlines distributed in mimeographed form will be supplied for 6 cents postage, while the limited supply lasts. Address the editor. The complete file of year-round programs submitted in advance to the chairman of the two meetings, Mrs. Routzahn, will be loaned for payment of express charges both ways. They weigh 6 pounds. Address the editor.

When the Devil Tempts the Writer—

Commenting on Bunyan's *Pilgrim's Progress*, his biographer states, "The style of the book is plain, such as the lowliest readers—even the farmers that spell out the words—can understand." Bunyan himself says concerning this book, "I could also have stepped into a style much higher than this in which I have here discoursed, and could have adorned all things more than here I have seemed to do; but I dare not. God did not play in convincing of me; the Devil did not play in tempting of me; wherefore I may not play in my relating of them, but be plain and simple, and lay down the thing as it was. He that liketh it, let him receive it; and he that does not, let him produce a better."

The celebration of the 300th anniversary of the birth of Bunyan this year and the fact that his *Pilgrim's Progress* is said to be the most popular book in the English language with the exception of the Bible, gives this advice special significance. Personally, I love his recipe for writing. Now for the first time I know that whenever I put an especially elaborate literary flourish into a manuscript, it is the Devil that has tempted me.

—Louise Franklin Bache, National Probation Assn.

Health in 1929 Commencements—

The emphasis on health as the special theme of the 1929 commencements should (a) lead each graduate to adopt a high standard of fitness for himself and to understand how to maintain that standard in terms of personal habits and medical and dental care; (b) include a special study by each graduating class of the time lost in its own school as a result of ill health, the findings to be presented as a part of a commencement program; (c) include special study of the lives of such great torch-bearers for health as Pasteur, Walter Reed, and William Osler; (d) include awards of school letters to graduates who have maintained high standards of health and school coöperation; (e) include special consideration by classes in professional colleges of education, medicine, law, and engineering of the part each profession can take in the improvement of public health.—

A Movement to Vitalize Commencements, *Journal of National Education Assn.*, Washington, Dec., 1928.

In the January issue the *Journal* urges again that health and safety be emphasized in 1929 commencements, and offers specific suggestions for elementary schools, junior high schools, senior high schools, colleges and professional schools. In colleges "orations and essays may be built around the lives of pioneers who have made significant contributions to medicine or public health. These may be descriptions of recent great discoveries such as insulin." In professional schools "let law students show how health may be advanced through better legislation," and so on. 25 cents for copy, 50 cents for both issues.

Doubts from the Outside—

In the absence of any definite proof of the nature of influenza, the present rush to close schools is of doubtful value. Children may easily find in the hours away from school exposures and risks that are quite as serious as those of the classroom. For millions of city people the common injunction to stay away from crowds is ludicrous in its impossibility of fulfilment. We live, move, and snuffle in crowds whether we will or not—and in the subways of New York we breathe in our neighbors' faces with undisturbed serenity because there is no other place to breathe.

—*The Nation*, Jan. 2, 1929.

Two Opportunities not to be Missed—The Early Diagnosis Campaign of the tuberculosis associations in March, and National Negro Health Week, March 31 to April 7, 1929, both offer possibilities for all health agencies and coöperating groups—not to help out the sponsoring organizations, but to utilize the opportunities presented. Ad-

dress any tuberculosis association and National Negro Health Week, Tuskegee Institute, Ala. At a conference of Negro Health Week leaders "it seemed to be the consensus of opinion that one of the greatest needs is an adequate supply of well trained public health nurses."

"Enter Your Tb Publicity Relics"—This is the plea of Dr. H. E. Kleinschmidt, as a committee of the National Tuberculosis Association. The specimens from a "dim, dark past" of tuberculosis publicity and education will be exhibited at the National Tuberculosis Association's 25th anniversary meeting at Atlantic City, N. J., in May.

Have **We Listed the Leading Citizens?**—Mrs. Mary Breckinridge, director of the Frontier Nursing Service in Kentucky, is reported as saying:

> The leading citizens of any community comprise approximately 10 per cent of its population. If the nurse seeks these out, uses them in committees and gets them educated as to what she is trying to do, she can accomplish anything.

Who are the "leading citizens"? The key individuals? The key organizations in the city or county? Have we made a plan, covering a year or several years, to inform them and to enlist them?

CONTESTS

In the April 1, 1929, poster contest conducted by the Massachusetts S. P. C. A. medals with blue ribbons are offered for first prizes, and medals with red ribbons for second prizes, with honorable mention for every school entering the contest. A good idea for health poster contests?

The Massachusetts contest covers drawings by pencil, or crayon, pen and ink, cut-out paper (original, not magazine covers, etc.), or silhouette, water color or charcoal. The use of colors is strongly recommended. For full conditions as a sample write the society, at 180 Longwood Ave., Boston, Mass.

A New York city worker asks about essay or limerick contests. Please send details of your contests, or mention who have held such contests.

If you have made use of soap sculpture, you will wish to get details of the fifth annual competition for prizes—closing May 1. Address: National Small Soap Sculpture Committee, 80 East 11th St., New York, N. Y.

Another simplified description of "Cutting and Printing Linoleum Blocks" is in *Scouting*, 2 Park Ave., New York, N. Y., Nov., 1928. 10 cents. Linoleum blocks offer possibilities for a new line of illustration for printed matter, and as a contest among children or adults.

The aftermath of the New York State Diphtheria Poster Contest is notable for the well developed plans for getting the most out of what might have been merely a contest in poster designing, with awards and a public display of the winning posters. Now that the first prize poster has been reproduced as a 24-sheet billboard poster the use planning continues. The winning artist will unveil one of the posters on LaFayette Square, in the center of downtown Buffalo. In many cities the schools will participate in the local "unveiling." Mrs. Marie F. Kirwan, S. C. A. A., 105 East 22d St., New York, N. Y., will send copies of mimeographed bulletins regarding the uses made of the poster contest. (One reader of this copy raises a question: Is the unveiling idea over-emphasis? What do you say?)

EXHIBITS

A blue ribbon was awarded the State Fair exhibit of the Tennessee State Dept. of Health. Entitled the "Journey through Life," "the periods of life—prenatal, maternal, infancy, preschool, school, adolescence, adult and old age

—were depicted by cardboard cut-out illustrations which showed both the correct and incorrect methods of living."

For those who visit New York City: the American Museum of Safety is at 120 East 28th Street, east of 4th Avenue. Leave any subway at 28th Street and go to the east.

How portable window exhibits were made by the staff of Bellevue-Yorkville Health Demonstration, New York, N. Y., and how drug-stores were led to give window space, is told in "Selling Health in Drug-stores," by Marjorie D. Candee, *Survey*, Jan. 15, 1929.

Many of the gay holiday wrapping papers (including those sold in five and ten cent stores) will give life to dull health posters and placards. Mount the poster so that several inches of the wrapper show on the top and both sides —and an inch or two more at the bottom.

The Smithsonian Institute, Washington, D. C., has issued a booklet descriptive of its permanent exhibit of visual lessons in health and hygiene and "those matters concerning personal and community cleanliness which should be known everywhere." 25 cents.

When you wish to construct a miniature bathroom as an exhibit, ask Jane Hufford, Chicago Tuberculosis Institute, 360 North Michigan Blvd., Chicago, Ill., for a copy of typewritten description. Miss Hufford reports that Marshall Field and Co., Chicago, sell for 95 cents a set of white enameled metal bathroom furniture. Bedroom furniture sells for $1.95—in white or mahogany.

MEETINGS

Five regional meetings of public health nurses in Indiana "were very successful." The groups were so small and informal that everyone felt free to bring up her problems and express her ideas.

How about trying on your service or luncheon clubs the idea of once a year calling for a "grand jury" report on the health problems of club members—the "jury" being appointed by a club a month or two in advance of the luncheon where the report will be presented? A new approach for getting group consideration of personal or community health needs?

IS PUBLICITY NEEDED?

The hygiene teacher in a mid-western college took her class to the headquarters of the local Visiting Nurse Association. Afterwards, one of the young men said, "I'm so glad we made that visit. I'd often seen those visiting nurses on the street, but I always thought they were nuns."

Any further examples to go under this heading?

WORDS

"A bath every day keeps you fit in every way."—In house organ of a state department of health. (Can this be true? Will their readers believe it to be true? If not, then what?)

RADIO

In the Public Health Section of the British Medical Assn. Dr. W. W. Jameson strongly commended "frequent four-minute broadcasts on matters of special health interest" as being more effective than longer talks at monthly intervals.—*The Lancet*, Aug. 18, 1928.

Recently, the Union des Grandes Associations Francaises pour l'Essor National (Union of French Associations for National Development) organized a special wireless health propaganda week. . . . Eminent French specialists spoke on school hygiene, housing, the venereal diseases, the anti-tuberculosis campaign, mental hygiene, health and education, the campaign against cancer, social insurance, women and public health, child welfare, and the anti-alcohol campaign.—*The World's Health*.

Feb., 1928. How like a "health week" program west of the Atlantic!—most everything, but not much of anything.

Two radio talks on cancer appeared in the July, 1928, issue of *Campaign Notes*, Am. Soc. for the Control of Cancer, 25 West 43d St., New York, N. Y.

Ten stations are now broadcasting a series of talks supervised by the Canadian Social Hygiene Council. Talks on child hygiene, smallpox, diphtheria, etc., are included in the series.

REPORTS

"One of the weak points in the popular health education progress of the city is the lack of standardized annual reports for the various public health agencies which will permit a central agency, such as the Federation or the Health Department, to compile the facts concerning the activities of the agencies, so as to present a composite picture of all activities in a particular field. The bringing together of information for public presentation of the needs in any field and the facilities available for meeting these needs is essential if continued and adequate public support is to be obtained."—*An Appraisal of Public Health Activities in Cincinnati, Ohio, for the Year 1926*, by the Committee on Administrative Practice of the American Public Health Association, p. 99.

A well organized account of widely diversified activities scattered over the whole country is presented in *The Story of May Day: 1924–1928*, by Katherine Glover. 108 pages. American Child Health Assn., 370 Seventh Ave., New York, N. Y. The half tones are grouped on 8 pages of good dull finish paper in the center of the book. Curiously enough there is no publication date. We think there should have been a table of contents or index, or both.

PEOPLE TO KNOW

George A. Dundon is now director of health education, Health Department, Milwaukee, Wis.

Thomas A. Burke has succeeded Arnold A. Mowbray as director of public relations, National Safety Council.

Mary Ross, who handles health topics in *The Survey*, and Bernard C. Roloff, Chicago Department of Health, are members of the Executive Committee of Educational Publicity Division of the National Conference of Social Work. Evart G. Routzahn was elected chairman for 1928–1929.

BOOKS AND REPORTS

Annals of the Pickett-Thompson Research Laboratory (*Vol. IV, Pt. 1*) —*London: Baillière, Tindall & Cox. Baltimore: Williams & Wilkins, Nov., 1928.* 250 pp. Price, $10.00.

The first of the volumes devoted to the streptococci was reviewed in this *Journal* in June, 1928, page 829. The present volume begins the study of the pathogenic streptococci and is given practically entirely to the rôle which these organisms play in rheumatic fever and its complications. Chorea is definitely declared to be a manifestation of cerebral rheumatism, a theory which has been held by some for many years, but has not been definitely accepted. The authors do not venture an opinion as to the etiology of erythema nodosum, though they give evidence indicating that it may be caused by streptococci, point out its apparent contagiousness and its relation to rheumatism, tonsillitis and endocarditis. Approximately 110 pages are given to the study of rheumatic carditis, including some 14 pages on treatment by streptococcal vaccines and sera.

With the exception of the section on erythema nodosum, the authors sum up the literature and give their conclusions. They hold that rheumatic fever is a definite specific disease exhibiting such constant and typical lesions as to make it highly probable that it is caused by a definite specific organism. It is generally preceded or accompanied by sore throat, so that it is probable that the specific organisms enter the system through the tonsils, in which they may remain for a longer or shorter time, causing systemic effects by the absorption of their toxins. They consider it much more probable that the germ enters the system. There is equally good evidence that the streptococci play an extremely important part in the production of rheumatic fever and carditis, but the differentiation of the varieties has been faulty and great confusion has resulted.

The authors continue to follow the methods devised by Dr. Crowe, and hold that the differential medium with the photographs of cultures introduced by him " will constitute a new stimulus and initiate a new era in bacteriological research." This opinion is again expressed in spite of some criticisms of the method after the appearance of Volume III.

The present work, like Volume III, shows an enormous amount of careful study of the literature and collation of facts. The microphotographs are excellent.

Volume IV will be completed by four further monographs, and will be followed by two more volumes on the pathogenic streptococci. In view of the excellence of the two volumes so far issued, we must look forward with much interest to those promised, and it may be again predicted that the entire series will be the most complete and authentic study of the streptococci which has been made. The volumes will be indispensable to every bacteriologist.

M. P. RAVENEL

Protecting the Semi-public Water Supplies along Pennsylvania's Highways—*Pamphlet of Pennsylvania State Health Dept.* 50 pp.

During the early spring and summer an intensive drive was made on semi-public water supplies along Pennsylvania highways. Thirty-two hundred miles of roads were covered and 3,130 drinking water supplies investigated.

Two mobile laboratories and the main state laboratory were used. Nine engineers, 3 laboratory assistants and 3 technicians composed the personnel.

Forty-five pages of the pamphlet are devoted to a detailed record of all supplies examined. It is to be noted that less than 50 per cent of the supplies examined on the first trip around were approved. ARTHUR P. MILLER

Handbook of the Health Exhibits of the United States National Museum—*By Charles Whitebread. Washington, D. C.: Smithsonian Institute, 1928.* 39 pp. Price, $.25.

In 1922 a Hall of Health was established in the Arts and Industries Building of the United States National Museum. This national health and hygiene exhibit has been growing gradually and is now fairly extensive, though not as yet commensurate with its original plan. The exhibit is ably described in this well printed and attractively illustrated pamphlet, which should be of value to all who are interested in public health education. JAMES A. TOBEY

A Doctor Looks at Marriage and Medicine—*By Joseph Collins, M.D. Garden City: Doubleday, Doran, 1928.* 313 pp. Price, $3.00.

Physicians have their own way of looking at things. Unless it be lawyers, none more than physicians have occasion to look into the complicated question of marriage. This title, in passing, is somewhat misleading. It might better have been "A Physician Looks at Marriage and Medicine," because there are many other kinds of doctors—divinity, philosophy, and whatnot.

After reading this book one must resume the attitude of expectancy. We still await *the* book by a physician on marriage as excellent in its presentation as the subject is important.

In the midst of a lot of words there are some arresting thoughts which occur at just sufficiently frequent intervals to keep one reading on. It is not very concise; it is none too clear; and better perhaps for neurologists to wade through, for the mental legs of ordinary readers are too short and not built for quick turns.

Some of the schemes advanced are novel, to say the least. For instance, on page 47 it is advocated that an intelligent woman, whom eugenists would class as a good breeder, should approach one of the opposite kind with the proposal that she will raise so many more children if the poor stock person will agree to breed so many less. Does the author advocate that plan seriously, or with his tongue in his cheek, or like a boy with a stone who throws it through a window to hear the glass crash?

The author assumes an attitude something like this: Now I shall stand apart as a neutral and discuss a very perplexing question. But, he does not maintain that attitude, for his neutrality is constantly interrupted by personal opinions which he occasionally seeks to bolster up with statistics. Where statistics are not available, or not sufficiently forceful, guesses are substituted in their place. W. W. PETER

The Principles and Practice of the Dilution Method of Sewage Disposal—*By W. E. Adeney. New York: Macmillan, 1928.* 161 pp. Price, $5.00.

Considering the fact that over three-quarters of the population of the United States disposes of its sewage by dilution in water courses, it is surprising that the dilution method of disposal has not been the subject of a fairly comprehensive text. This lack the present volume supplies in a very satisfactory and helpful manner. Once more, but in this instance in more detailed fashion, the general principle is emphasized that discharge of sewage into a stream, in con-

trolled amounts, offers a true method of disposal, comparable in status with, and more widespread in application than any other method of disposal now available. The indiscriminate prohibition of discharge of raw or settled sewage into streams, at present the gospel of some misguided sportsmen, is as unintelligent a program of action as a policy of unrestricted discharge would be. Dr. Adeney sets forth in unusually instructive fashion the general principles underlying the dilution method of disposal and the analytical indices of purification helpful in the application of these principles. He supplies a reference book of much importance to those concerned with the significant problems of sewage disposal. Lay and professional readers will be impressed with the interesting and logical evolution of the subject matter, from both the historical and scientific viewpoints.

The author is peculiarly fitted for the present task by virtue of his own original contributions to research in sewage disposal and his affiliation with the investigations of the Royal Commission on Sewage Disposal of England, the Metropolitan Sewerage Commission of New York, the Sanitary District of Chicago, and of similar agencies elsewhere. His theme is that any given river has a measurable capacity, through the agencies naturally existing in it, for the work of disposing of and purifying the raw or settled sewage of a community, at the same time protecting properly the amenities of the river and its fish and vegetable life. The recognition of this principle is of vast economic and sanitary importance.

In the development of the theme, the author points out the fundamental fallacy, originally given authoritative emphasis by the erroneous conclusions of the Rivers Pollution Commission of 1868, that the changes in a sewage polluted river were purely chemical rather than biochemical in nature. Finding no traces in their studies of streams of characteristic end-products of complete oxidation, the commission's recommendations resulted in the unscientific and unsuccessful prohibitive legislation, the Rivers Pollution Prevention Act of 1876. In intent and in theory, the Act returned streams to their pristine purity; in fact, it did little more than retard progress in stream pollution investigation and regimentation.

Adeney reviews the progress from that time on and provides a remarkably clear analysis of the historical and scientific data now available in this field. Chapters are devoted to characteristics of bacteria and higher forms of stream life, the course of fermentative changes of sewage matter, the formation and effects of "humus," the mechanism of purification of sewage liquor by the dilution method, the rates of consumption of dissolved oxygen by sewage and the rate and mechanism of surface aeration. A chapter is devoted to a careful comparison of the standards earlier recommended by the Royal Commission with the area and depths of streams.

It is gratifying to note the author's emphasis, in Chapter 8, upon the injurious effects of sewage solids in rivers and streams, an emphasis entirely concordant with the experience and policy of most American engineers.

The book concludes with several chapters on methods of analysis, special apparatus, and collection of samples. The bibliography is excellent, the table of contents most complete and instructive, and the paper, typography and arrangement attest the usual high standard of the productions of the Cambridge University Press.

The reviewer cannot resist the temptation to inquire, at no risk of reflecting upon the excellence of the present text, why the author refers so briefly and, we may presume, inadequately to the excellent contributions on the mechanism of stream purification issued

by the Cincinnati Stream Studies Station of the U. S. Public Health Service. Their findings would add even further to the already great value of the text.

ABEL WOLMAN

Fundamental Gymnastics—*By Niels Bukh. Translated, rearranged and adapted for use in America by Emily Russell Andrews and Karen Vesterdal. New York: Dutton, 1928.* 202 pp. Price, $2.00.

This book attempts to set forth the theories and practices in gymnastics of Niels Bukh, whose work in Denmark has considerable vogue, and which has been much advertised and exploited by a certain group in the United States.

Originally it was designed by Bukh to correct maladjustments and faulty occupational habits of posture. In this country, those who have been most interested are largely specialists in the corrective and remedial field of gymnastics.

These gymnastics are designed to remedy stiffness, lack of power, and awkwardness or lack of coördination. The objectives, as set forth in the text, are flexibility, strength, and coördination or agility. The translators claim that the exercises were not designed as a system, and that they are made up of non-definite movements. These aim also to "increased and unlimited range of movement." They are somewhat self-testing.

The book, in addition to general statements and exercises, presents definite chapters on exercises for flexibility, strength, coördination, combined exercises, and self-testing exercises.

The exercises described are largely of the corrective-gymnastic type, frequently reënforced by the individual grasping his own legs or ankles to secure greater flection at the hip and back. Many of them are forced and strained and frequently made more so by the pulling or pushing of a second individual. They tend particularly to pull and stretch the structures of the lower back.

These are formal exercises—many of them of great power—which would be corrective in the hands of an expert, but dangerous in the hands of a person who did not have an intimate knowledge of the anatomical structures concerned, and also an intimate knowledge of kinesiology. These are not exercises to be used by the product of some six weeks' summer course. For the person interested and trained in the corrective gymnastics, this book presents many valuable exercises.

C. H. KEENE

Wheat Flour and Diet—*By C. O. Swanson, Ph.D. New York: Macmillan, 1928.* 203 pp. Price, $2.50.

Although some food faddists and similar fanatics have attempted to decry the plentiful use of bread in the diet, usually for absurd and fantastic reasons, the "staff of life" properly continues to be one of our most important and valuable foodstuffs. By no means is it a complete food, but all competent authorities agree that at least one-quarter of the daily diet may consist of cereal foods, including white bread. Professor Swanson recognizes the limitations as well as the value of wheat and does not hesitate to set forth the former and to recommend that bread be supplemented in the diet with such all-round foods as milk and leafy green vegetables. Most modern bread is, for that matter, made with milk. This book is not propaganda for wheat, but is an impartial and accurate account of the kinds of wheat, their preparation and methods of milling, the food constituents of wheat, and its proper place in the diet. The chapters on nutrition are correct and the whole book will be of value to sanitarians, home economics workers, and others who desire succinct information on this subject. The book should also be of value and interest to the general lay public.

JAMES A. TOBEY

The Genesis of Epidemics and the Natural History of Disease. *An introduction to the science of epidemiology based upon the study of malaria, influenza and plague—By Clifford Allchin Gill, Lt. Col., Indian Medical Service. New York: William Wood.* 550 pp., 19 charts, 10 maps, 1 diagram. 1928. Price, $7.50.

The author's primary and basic thesis is that epidemics of all diseases and all types of epidemics are dependent upon an identical mechanism. The genesis of epidemics is in all probability the outcome of a unitary mechanism. The nature of this mechanism is explained by the quantum theory which postulates that all epidemical phenomena are essentially dependent upon a change in the relationship of the infection quantum and the immunity quantum. It ascribes the precise cause of "loss of equilibrium" between "infection" and "immunity," primarily and predominantly, to an increase of the infection quantum; in other words, it postulates that the essential factor in the causation of epidemics is of a quantitative rather than a qualitative nature. The theory also regards the circumstances associated with oscillation of the infection quantum as likewise conducive to correlated oscillations of the immunity quantum.

An epidemic is thus regarded as mainly the outcome of a quantitative change of the transmission factor and the immunity factor, and the intensity of epidemics is held to be a function of the range of amplitude of these factors, which, in turn, is attributed to the influence of climatic conditions in determining a great and sudden elevation of the infection quantum and a corresponding depression of the immunity quantum.

Other subsidiary factors are concerned in the operation of the quantum theory; thus climatic conditions responsible for the oscillations of the infection quantum and of the immunity quantum may occasion correlated changes of the human factor and of the parasite factor also, which add to the disturbances in the equilibrium between infection and immunity.

It might appear that this admission by the author would allow for changes in virulence in the parasite which he elsewhere seeks to set aside as quantitative rather than qualitative. He regards the occurrence of qualitative changes in specific parasites in the direction of exalted virulence as not entirely free from doubt. Attenuation is not discussed in this connection.

Prolificity, induced by favorable climatic or other conditions, in his opinion affords a quantitative aspect of the toxicity of epidemics, which may be substituted for the qualitative change in the *materies morbi*. It may be held that the difference of toxicity exhibited by pneumonic and bubonic plague is indicative of the variable virulence of the plague bacillus, but it may with equal cogency be argued that the facts are capable of an alternative explanation. It is, in fact, possible that an aerial route of transmission has placed the organism in an environment highly favorable to its prolificity—in other words, to its multiplication—and that the extreme toxicity of pneumonic plague, as compared with bubonic plague, is indicative of an extremely high infection quantum. The relative toxicity of the pulmonary form of anthrax (wool-sorter's disease) and malignant pustule, and of pulmonary tuberculosis, as compared with lupus, may be susceptible of a similar explanation; it is possible therefore that a change of toxicity, in association with a change in the route of transmission, is indicative of a change in the quantum of infection.

In the light of these considerations it

is held that the enhanced toxicity exhibited by epidemics is capable of explanation in terms of a change in the quantum of infection, and that, since the facts appear to be capable of explanation upon this basis, it is unnecessary to assume that the specific parasite undergoes any change of virulence prior to the occurrence of epidemics.

The author has applied his quantum theory to the epidemics of malaria, plague, and influenza in recent years in the Punjab and in every case finds that the data are in conformity with his quantum theory. One of the striking features of the epidemic diseases of India is their higher intensities, measured in the case of a lethal disease, by the death rate per 1,000 of the population, in the subtropical as compared with the tropical parts of that country. Malaria in subtropical India may reach a mortality twenty times above normal. Plague mortality in 1898–1918 was 122.2 in the Punjab, 3.4 in Madras, and 1.4 in Bengal. In the pandemic of influenza of 1918–1919 the death rate in the plains of the Punjab was 58, and only 8.5 per 1,000 in Bengal. It is therefore clear that each of these three great epidemic diseases—two of which are insect borne and one air borne—exhibit precisely similar features in respect of their high intensity in the north and their low intensity in the strictly tropical parts of India. The available data in connection with epidemics of relapsing fever and smallpox (before the introduction of vaccination) are also consistent with the view that these diseases also exhibit relatively high intensity in the north of India, and it is therefore justifiable to conclude that "intensity" constitutes one of the generic features of epidemics, and that it should, in consequence, be explicable in terms of the quantum theory.

The more equable conditions in the tropical parts of the country prevent marked disturbances in the equilibrium between infection and immunity, while the sharp climatic contrasts in the Punjab afford opportunities of great disturbances and thus for epidemics of maximum intensity. The high death rate in the Punjab is the outcome of the influence of climatic conditions upon the unitary infection-immunity mechanism.

"What is it moulds the life of man?
The Weather!"
What is it swings the scythe of Death?
The Weather!

Biologists, not statisticians, are not as yet convinced, however, that genetic differences in host and parasite can be thus dismissed as factors in epidemics. The recent evidence of the experimental induction by Muller and by Patterson of similar changes in germ cells and soma by radiant energy tends to support the view that biological changes in both host and parasite, as well as the weather, may be concerned in the problems of epidemiology. C. A. KOFOID

An Introduction to Practical Bacteriology—*By T. J. Mackie, M.D., D.P.H., and J. E. McCartney, M.D., D.Sc. (2d ed.) New York: William Wood, 1928.* 390 pp. Price, $3.50.

During the 3 years which have elapsed since the appearance of the first edition of this excellent practical guide, bacteriology has made considerable advances. The authors have taken advantage of the necessity for a new edition, not only to bring the material up to date, but also to supply some deficiencies noted in the first edition. The size of the book has been increased by approximately 100 pages. The most notable additions are an increase in the material devoted to immunological methods and brief details concerning the most important pathogenic organisms of domestic animals. Many of these produce disease in man, and others, the streptococci for example, are

identical in appearance in man and animals, and the bacteriologist must know all types in order to conduct his work properly.

The authors speak rather positively about the Dick reaction, and do not give the Dochez method of producing antitoxin. They do not mention either the vaccine or serum against anthrax. General methods for the preparation of bacterial vaccines are given, but these do not apply to anthrax vaccine.

On the whole, we consider the work among the best of its type, and can heartily recommend it to teachers and students alike. The printing and binding are good. The price seems excessive for a book of its size.

M. P. RAVENEL

The Community Use of Schools—*By Eleanor Touroff Glueck. Baltimore: Williams & Wilkins, 1927.* 222 pp. Price, $3.00.

In an interesting and well written volume Dr. Glueck presents the results of her study of the extra-curricular use of school buildings in the United States. Her personal contact with the school center movement in Boston covering a number of years makes her discussion of the problems involved in this movement especially significant. She has in this study attempted to secure, for the first time, with the assistance of the U. S. Bureau of Education, information regarding the school center movement in rural sections of the country.

Dr. Glueck, for the purpose of this study, has defined a social center as the use of a school building once a week for two types of activity, or twice a week for one type not including night schools. She reports a more general use of school buildings for community purposes in rural districts than in cities. While but 5½ per cent are being used regularly for community purposes, the school houses in the United States are quite generally open for occasional community purposes. The administration of school centers is usually under the board of education, but 10 per cent of centers are under the control of private groups, though 21 per cent are entirely self supporting.

A valuable part of the book is a compilation of the school laws of the various states which have to do with the use of school buildings for community purposes. In a chapter tracing the development of interest in the use of school buildings for outside activities, Dr. Glueck points out the various factors which have influenced state legislation on this subject. The states are shown to vary in regard to this aspect of schools fully as much as they do in regard to other phases of education. Oregon has a state law prohibiting dancing in public schools. Some states prohibit religious meetings, others permit them. Dr. Glueck feels that interchange of experience among those interested in the movement is one of the greatest needs of the present day. Creative leadership such as the movement in Wisconsin has had, would go far to assist in solving some of the problems in connection with the administration and conduct of school centers.

JOSEPHINE BROWN

A Manual of Water Supply, Sewerage and Sewage Treatment for Public Buildings in Ohio, *for Engineers, Architects, etc. Div. of San. Engineering, State Department of Health, Columbus, O., 1928.* 13 pp. and charts.

This excellent bulletin defines for designers the requirements of the state health department with respect to water supply and sewage treatment devices for such buildings as are not situated so as to have access to public water and sewerage systems.

Applicable sections of Ohio laws are quoted, and suitable cuts of wells and sewage treatment appliances are shown.

It is pointed out, however, that the cuts are not intended to be working drawings but to illustrate essential details.

Architects and engineers engaged in designing public schools and other buildings in Ohio should welcome this publication, as it leaves no doubt nor makes no mystery of what is desired. Consistent use of it should tend to improve and standardize sanitary installations in that state. ARTHUR P. MILLER

Progress Report on Cannery Waste Treatment Studies. *State Department of Health of Ohio, 1928.* 85 pp.

This bulletin presents in a concise form the results of researches on the treatment of cannery wastes.

During the fall of 1926, at Canal Winchester, O., the Ohio Canners Association fostered studies of the treatment of raw wastes from packing plants for corn, succotash and lima beans by means of fine mesh mechanical screens, chemical precipitation, and chlorine sterilization, and of the oxidizing of these wastes screened on coarse filters of laths and of crushed limestone as well as on two sand filters.

During 1927, the Association of New York State Canners, Inc., continued these studies at Albion, N. Y., by investigating principally the oxidation of wastes from green bean and tomato packing plants. Some data on dried bean canning and pea wastes were also procured.

Both studies are admirably summarized at the beginning of the bulletin, making it unnecessary to read the entire mass of data unless a detailed study of it is essential.

The conclusions can probably not be stated better than in the summary where they are given as follows:

1. Mechanically operated fine screens with openings of about 0.010 inch are most essential features of treatment plants. Where oxidizing processes are employed for tomato products waste, following screening a relatively short period of sedimentation is necessary.

2. The organic matters in finely screened corn, lima bean, succotash and green bean wastes are removed with sufficient thoroughness to correspond to the requirements of extremely limited dilution, by coarse grained trickling filters operated at rates of 2,000,000 gals. per acre per day and 250,000 gals. per acre-ft.

3. Coarse grained trickling filters operated at the above rates cause a substantial reduction in the organic matters dissolved in finely screened and settled tomato products waste, but under the test conditions the effluent is not stable, requiring at least a four-fold dilution with normal stream water.

4. Chemical precipitants under controlled application and with effective arrangements for the complete separation of the resulting floc, remove to a most substantial degree the dissolved organic matters in finely screened tomato products waste. The settled effluent is completely stable.

5. Where waste treatment is required, the complete separation of cooling water from the wastes proper is essential.

6. Silage or stack juices should ordinarily be removed by cartage. Similar disposition may often advantageously be made of blancher wastes from pea and dried bean processing. Core-skin puree should be hauled away if produced, or preferably tomato residues incident to chili sauce production should be conveyed to carts uncycloned.

ARTHUR P. MILLER

Lehrbuch der Hygiene für Studierende, Arzte und Gesundheitsbehörden—*By Dr. med. et phil. Ernst Gerhard Dresel. Berlin: Urban & Schwarzenberg, 1928.* 499 pp. 38 figs. Price, $5.50.

The comprehensive nature of hygiene as conceived by the Professor of Hygiene and the Director of the Hygienic Institute of the University of Greifswald is illustrated in this textbook. The guiding principle appears to be development of the physical and social life of man which this science protects from unhygienic modes of life arising from industrial necessities, untoward customs and ignorance. The social art of healthful living in the midst of urban industrial life is the underlying theme. General

theoretical considerations usually conceived as within the field of sociology receive generous consideration, such as movements of population, age at marriage, decline of birth rate, sterility, influences of the industrial age, Taylorismus and Fordismus, and governmental insurance.

The book is an admirable one in its wealth of detail, as, for example, under conditions of health we find discussions in manifold particulars of air, weather and climate, water, soil, clothing, food and nutrition in greatest detail. The personal hygiene of all ages and conditions of men is analyzed especially with reference to the health of the workers in the industries.

The discussion of communicable diseases is far less satisfactory, since it is so abbreviated and condensed.

CHARLES A. KOFOID

Handwörterbuch der Arbeitswissenschaft unter Mitwirkung von 280 Fachleuten des In- und Auslandes—*Herausgegeben von Privatdozent Dr. Fritz Giese. (Halle a/S., Carl Marhold Verlagsbuchhandlung.) 1. Lieferung: Abbau-Arbeitsmedizin.* Columns 1–320 (160 pp.). 1927. Price, RM. 9.00.

This is an ambitious piece of dictionary making which attempts an objective presentation of the data pertaining to labor without favor of concession to nation, party, class or confession. It aims to furnish a systematic, scientific presentation of "Arbeitswissenschaft" in the technical, medical, psychological, legal, pedagogic, industrial, and philosophical aspects. It will be issued in 10 parts, constituting 2 volumes, to be completed early in 1928. The 8-hour day, alcohol, old age relief and old age insurance, worker's psychology, America, and industrial hygiene are among the subjects treated in the first part, and bibliographies are appended to the leading entries. Under "Alkohol" we note an entire omission of American data and no citation of American work. Guinea-pigs, Volstead and abstainers are noteworthy for their absence. The discussion of industrial hygiene contains a useful summary of existing German regulations for the protection of workers from industrial hazards. The work promises to be a valuable summary of current German ideas, custom and practice as regards labor, and therefore very timely for reference and comparison.

CHARLES A. KOFOID

Sanitary Engineering Laboratory Manual—*Arranged by Robert B. Van Horn. Seattle: University of Washington Book Store, 1928.* 23 pp.

This manual, prepared particularly for use in the University of Washington sanitary engineering laboratory, might better be titled so as to indicate application in a water laboratory as it refers only to tests on water.

After brief descriptions of the types of analyses, the sanitary survey, interpretation of results, sampling, and laboratory technic, the author covers laboratory procedures for making physical, bacteriological, microscopic and some chemical examinations. The text is suitable for instruction purposes because of its simplicity and its exclusion of matter not necessary for the use of the beginner.

ARTHUR P. MILLER

The Voyage of Growing Up—*By C. E. Turner and Grace T. Hallock. New York: Heath, 1928.* 192 pp. Price, $.76.

This volume has been prepared for the third and fourth grades and presents health training activities in an interesting manner to children of this school age. A criticism that can be made of this story of the two children who have health adventures is that it attempts to combine mythology, realism and health education. However, the book is charmingly written.

HEALTH DEPARTMENT AND OTHER REPORTS

IRA V. HISCOCK

Los Angeles, Calif.—The cover and title page of this report for the year ending June 30, 1928, bear the seal of the city, founded in 1781. An introductory statement of the health officer is that the health department supervises the health of 1,250,000 persons and watches the sanitation of a city of 425 square miles, with a per capita expenditure of 56 cents. Health bureaus have been established in special districts at Venice, San Pedro, Watts, Sawtelle, and Van Nuys, in addition to 23 "health centers" which "provide a personal touch with individual and family units in their own environment."

Following a financial statement are reports of the various divisions. It is noteworthy that the nursing division gives care to the sick in their homes, "at the same time teaching the family the way of healthy living. . . . The expectant mother is taught the principles of personal hygiene, as especially adapted to her needs." The division is now providing nursing care to the policy holders of the John Hancock Mutual Life Insurance Company and the West Coast Life Insurance Company on a fee per visit basis. Good photographs illustrate some of the problems in the nursing field.

Another interesting feature is the account of the city maternity service which received 3,564 applications for care, and supervised 1,334 deliveries. There were 3,540 prenatal calls to patients' homes and 10,513 post partum visits. Attendance at the maternity dispensaries included 3,085 new cases and 9,713 old cases. At this clinic there were 2,611 new cases interviewed by the Social Service Bureau. "We believe that a service which can point to 1,334 deliveries without loss of life to a single mother is a service that is of inestimable value to Los Angeles and to the country as a whole." A group of 8 resident physicians devote their entire time to this work, in addition to a staff of attending obstetricians and consultants.

The object of the dispensaries is to provide medical supervision for those women who are unable to pay for the services of a physician during their pregnancy, regardless of whether they are to be delivered by the service, or expect to go to the General Hospital or to some other similar institution for confinement. Patients are required to go to the dispensary every two weeks throughout pregnancy. A routine Wassermann is done on every new case, and urinalysis and blood pressure readings are taken at each visit. Two social service investigators are employed, but the report recommends that this work be assumed by the Nursing Division under the direction of a social service supervisor.

Seattle, Wash.—Under the title "Your Health Department," the Seattle health and sanitation bulletin, beginning with October, 1927, has carried a series of interesting articles dealing with the health department and health conditions in that city. These articles have been carefully prepared, with headings and sub-headings, charts and photographs, appropriately distributed throughout the series. The activities charted include administration and vital statistics, quarantine, plumbing inspection, milk, meat and dairy inspection, sanitation, laboratories, hospitals and clinics, social service, tuberculosis control, child welfare, garbage collection and disposal, and insect control.

The Commissioner of Health exercises supervision over all health department

activities and is responsible for all policies other than those laid down in the regulations of the State Board of Health or in the ordinances of the city council. The city charter provides that he must be a physician. The commissioner also acts as head of the division of vital statistics, as this "health bookkeeping" is closely related to administration affairs.

Infant mortality rates have declined in this city from 118 in 1905, and 84 in 1910, to 41 in 1927. Three units comprise the child welfare division of the health department, including administration, clinic service and visiting nurse service. The child welfare clinics are primarily for the purpose of keeping well children well. In addition, all the clinical, laboratory, and hospital facilities of the department are available for the purpose of making diagnosis or giving treatment when necessary. The physicians in attendance at the clinics are s e l e c t e d children's specialists. "Some parents fail to bring their infants and children to the clinics. Their children need care and supervision as urgently as those in regular attendance. These children are reached through the efforts of the visiting nurse, who goes to their homes as well as to the homes of those who attend the clinics."

Illinois—The second volume of *The Rise and Fall of Disease in Illinois*, published by the State Department of Public Health in commemoration of its 50th birthday, 1927, is devoted to a history of local health service, and a summary of the work at Chicago and at each of 27 down-state municipalities. Further chapters relate to the sanitary district movement, the tuberculosis sanatorium movement, rural health service, and the sanitary supervision of milk. An appendix contains the annals of health, sanitation, and public health service. It is a well bound volume of 493 pages, and contains a detailed general index as well as an index of auxiliary health agencies, and a bibliography.

The sections of each of the down-state municipalities contain a short history of the public health movement in the city concerned, and a description of the health machinery, water supply, sewerage, and general health conditions. Graphs and tables clearly present the essential vital statistics, and recognition of service is given by picture reproductions of past and present health officers.

The section on Chicago is rendered in greater detail. The health department of the city was established July 19, 1876, taking over the powers and duties of the board of health which had been in existence since 1867. The ordinance provided for a commissioner and an assistant commissioner of health, a secretary and assistant, two meat inspectors and 13 sanitary policemen.

From here the work of the department is reviewed in successive steps, the first being the pre-bacteriologic period, 1876–1892, the first years of which were those of highest death rates, chiefly due to communicable diseases. To combat these, the reporting of contagious diseases by physicians, and the placarding of scarlet fever were made effective in 1877 and diphtheria isolation was started in 1888. However, the more productive work of this period was concerned with the improvement of tenement house and workshop and filth conditions, the surveys leading to the establishment of the Chicago Sanitary District in 1889 and the building of the drainage canal.

The second period, 1892–1906, was that of the control of communicable diseases through applications of the bacteriological principles uncovered by Pasteur and Koch in the 70's and 80's, and the development of food and milk inspection. Dairy inspection was started in 1902, and sanitary inspections of milk depots and bacteriological ex-

aminations of milk samples in 1905. Publicity and education in public health work became recognized as of prime importance, and much attention was given to educational propaganda. The development of quasi-public agencies came in this period, the Chicago Visiting Nurse Association, 1888, Hull House, 1889, Chicago Lying-in Hospital, 1895, Chicago Association of Day Nurseries, 1897, City Club, 1903, and the Juvenile Protective League, 1904. The efforts of the department during the last period, 1907–1927, have been directed toward the systematic control of the various preventable diseases, and the enlargement, on a comprehensive scale, of the other activities of the department, such as the control of the milk supply, meat and food inspection, ventilation, and water supply control.

The sanitary district movement in Illinois, initiated by the establishment of the Chicago district, has grown rapidly in the last few years. In 1911 the creation of the North Shore Sanitary District was authorized, and after the passing of the Act of 1917, which authorized the creation of sanitary districts wherever a desire was manifested by petition, 17 other sanitary districts have been started.

The agitation for tuberculosis control was initiated in the 90's, but proceeded slowly until 1908 when legislation was passed to construct and maintain tuberculosis sanatoriums in cities where desired by popular vote. This led to the gradual growth of the county sanatorium idea which was recognized by legislation in 1915. Since that time 46 counties have been collecting taxes under the tuberculosis sanatorium law, and 15 sanatoriums have been built.

The unfavorable action of the past three legislatures has seriously handicapped efforts toward the establishment of full-time county health officers as the initial step in rural health service. With the aid of the Rockefeller Foundation and the U. S. Public Health Service, however, several full-time county health departments have been organized.

Newark, N. J.—The first page of Newark's 43d report is reproduced because of the information given in a brief space in the introduction.

Newark—A Healthy City

(Population July 1, 1927—467,000)

Outstanding Evidences in 1927	
Crude Death Rate (5,086 deaths) (Lowest ever)	10.9 per 1,000
Adjusted Death Rate (4,837 deaths) (Including Soho & Verona deaths, excluding non-residents)	10.3 per 1,000
Birth Rates (10,042 births) (Lowest ever)	21.5 per 1,000
Infant Mortality (deaths under 1 year per 1,000 living births—lowest ever)	63.3
Typhoid fever mortality	1.3 per 100,000
Tuberculosis mortality (all forms) (Lowest ever)	82.9 per 100,000
Diphtheria mortality	13.3 per 100,000
Scarlet fever mortality	2.6 per 100,000
Smallpox mortality	Not one death since 1903

Among other features, this report has one of the best series of graphs contained in any report during the year. Disease reports are classified by age, sex, month, and wards of the city. A classified financial table concludes the report.

New Haven, Conn.—Bound in gray covers, the report of this city of 184,887 population covers 59 pages. Its attractiveness and readability would be improved by the use of soft paper and larger type for the descriptive text. A good organization chart showing bureaus, personnel, and budget, occupies an introductory page. A resident death rate of 10.0, a birth rate of 19.0, an infant mortality rate of 54.0, a pulmonary tuberculosis rate of 44.3, and a diphtheria rate of 1.6, are reported. There were no deaths from typhoid fever during the year.

Under a new anti-tuberculosis program, with a full-time medical director, nursing service is provided by the Visiting Nurse Association. To assist in the recognition of early cases, the department gives financial assistance for X-ray examinations for patients not in the dispensary group, but for whom the standard charge would be a hardship. An up-to-date register of cases has been prepared. All anti-tuberculosis forces of the community have been coördinated and are working together smoothly and efficiently.

During 1927 nearly 5,000 children were added to the list protected from diphtheria, and of this number 2,000 were babies or in the preschool group. A large proportion of the school group is now protected. Under the auspices of the Health Section of the Community Chest, a comprehensive health survey of the city was undertaken and was completed in 1928. A limited number of copies of the published report is available for distribution to health officers who may desire them.

BOOKS RECEIVED

KEEPING MENTALLY FIT. A Guide to Everyday Psychology. By Joseph Jastrow. New York: Greenberg, 1928. 297 pp. Price, $3.50.

HEALTH AND PHYSICAL EDUCATION. (For Elementary Schools.) By A. F. Myers and O. C. Bird. New York: Doubleday, Doran, 1928. 342 pp. Price, $1.50.

GROWTH. By Robbins, Brody, Hogan, Jackson, Greene. New Haven: Yale University Press, 1928. 189 pp. Price, $3.00.

THE SCIENCE OF NUTRITION. (4th ed.) By Graham Lusk. Philadelphia: Saunders, 1928. 844 pp. Price, $7.00.

HOW TO ENJOY HEALTH. Counsels and Maxims for the Healthy Life. By Claude Lillingston and Norah Hill. London: Hodder & Stoughton, 1928. 287 pp. Price, $1.00.

PROHIBITION STILL AT ITS WORST. By Irving Fisher and H. Bruce Brougham. New York: The Alcohol Information Committee. 1928. 358 pp. Price, $1.50.

NUTRITION IN HEALTH AND DISEASE FOR NURSES. By Lenna F. Cooper, Edith M. Barber and Helen S. Mitchell. Philadelphia: Lippincott, 1928. 574 pp. Price, $3.00.

CHILDREN'S BEHAVIOR AND TEACHERS' ATTITUDES. By E. K. Wickman. New York: Commonwealth Fund Division of Publications, 1928. 247 pp. Price, $2.00.

ANNUAL REPORT OF THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE OF THE UNITED STATES FOR THE FISCAL YEAR 1928. Washington: Government Printing Office, 1928. 346 pp.

CHILD STUDY DISCUSSION RECORDS. Development—Method—Technique. By Margaret J. Quillard. New York: Child Study Association of America, 1928. 74 pp. Price, $.75.

THE EPIDEMIOLOGY OF LEPROSY IN AUSTRALIA. By Cecil Cook. Commonwealth of Australia, Department of Health. Canberra: H. J. Green, Government Printer, 1927. 303 pp.

NURSING CARE OF COMMUNICABLE DISEASES. By Mary Elizabeth Pillsbury. Philadelphia: Lippincott, 1929. 463 pp. Price, $3.00.

COMMUNICABLE DISEASES FOR NURSES. By A. G. Bower and E. B. Pilant. Philadelphia: Saunders, 1929. 327 pp. Price, $3.00.

HANDBOOK OF MICROSCOPICAL TECHNIQUE. For Workers in Both Animal and Plant Tissues. By C. E. McClung. New York: Hoeber, 1929. 495 pp. Price, $8.00.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH. D.

Causes of Puerperal Septicemia—The report of a Massachusetts Committee to investigate deaths due to puerperal septicemia summarizes the causes. Similar investigations in other states ought to have a wholesome influence on maternal health.

ANON. **Report of the Committee on Survey of Incidence of Puerperal Septicemia in Massachusetts, 1927.** New England J. Med., 199, 25: 1253 (Dec. 20), 1928.

Frequency of Pfeiffer's Bacillus Findings—Pfeiffer's bacillus, found frequently in normal throats at all times, was more frequently recovered from people with colds, much more frequently in pneumonia. There was no correspondence between the incidence of the bacillus and influenza.

BOURN, J. M. **Incidence of Pfeiffer's Bacillus in Throats during Epidemic and Interepidemic Periods in Chicago.** J. Prev. Med., 2, 6: 441 (Nov.), 1928.

Milk Sickness—An article describing the metabolic disturbances in animals caused by eating the white snakeroot and the effect upon humans consuming milk from sick cows.

BULGER, H. A., *et al.* **Milk Sickness and the Metabolic Disturbances in White Snakeroot Poisoning.** J. A. M. A., 91, 25: 1964 (Dec. 22), 1928.

Prohibition—Dr. Emerson shows the decrease in deaths from alcoholism and cirrhosis of the liver, and the decline in the percentage of admissions of alcoholic psychoses to mental hospitals, which point to an improvement in public health brought about by prohibition. In addition, he calls attention to improvements in the general and tuberculosis death rates, the decrease in cases of drug addiction, crimes against chastity, the increase in school attendance in upper grades, and the increase of milk consumption, and offers these as evidence of value of prohibition to public health.

EMERSON, HAVEN. **Prohibition and Public Health.** Survey, 61, 5: 289 (Dec. 1), 1928.

Experiments in Food Poisoning—Heat-killed cultures of nine strains of *Salmonella sp.* when fed on an empty stomach failed to produce symptoms of food poisoning. This experiment gives no support to the theory that outbreaks of food poisoning have been caused by a thermostable toxin of these organisms.

DACK, G. M., *et al.* **Unsuccessful Attempt to Produce Salmonella Intoxication in Man.** J. Prev. Med., 2, 6: 479 (Nov.), 1928.

Chlorination of Water—This paper reports upon municipal experience in pre-chlorination of water supplies, the use of chlorin in algae control and in preventing sludge putrefaction.

ENSLOW, L. H. **Progress in Chlorination of Water.** J. Am. Water Works A., 20, 6: 819 (Dec.), 1928.

Regional Vaccination—A translation of a rather flowery account of Besredka's method of local immunization against staphylococci and streptococci. The paper is intended for the intelligent layman.

EPSTEIN, S. **Antivirus Vaccines in Surgery.** Scient. Month., Jan., 1929.

Health Examinations and Cancer—Periodic health examinations carefully done will discover precancerous

conditions and the earliest evidences of localized cancer. A plea is made for physicians to "expose" themselves to the contagion of enthusiasm for the health examination project. A valuable antidote for such papers as the recent one by Clendening.

FAUGHT, F. A. Health Examinations as a Means of Diagnosis in Cancer Control. Med. J. & Rec., 128, 10: 515 (Nov. 21), 1928.

Midwifery in Great Britain—A brief account of the prenatal and postnatal services established in England. Interesting as a comparison of the work there and in most states of the U. S. A.

FLIEGER, M. L. Midwifery in Great Britain. Am. J. Nurs., Dec., 1928, p. 1194.

Epidemiology of Whooping Cough—An enlightening review of the subject, showing, among other interesting findings, that whooping cough is the most common of the diseases that frequently cause death in the preschool years, and that 95 per cent of all deaths from whooping cough occur during the first 5 years of life. The protection of young children by isolation and vaccination is urged. The preventive campaign is much the same as for measles.

GODFREY, E. S. Epidemiology of Whooping Cough. New York State J. Med., 28, 23: 1410 (Dec. 1), 1928.

Improving Faulty Posture—A discussion of exercises by which posture defects may be corrected by bringing into proper action the antigravity muscles.

HAYNES, R. S. Postural Reflexes. Am. J. Dis. Child., 36, 6: 1094 (Dec.), 1928.

Cod Liver Oil in Milk—A brief note suggesting the substitution of cod liver oil for some of the fat content of milk used in infant feeding.

IRISH, H. E. Cod Liver Oil as a Substitute for Cream in Feeding Mixtures for Infants. J. A. M. A., 91, 24: 1884 (Dec. 15), 1928.

School Lighting Practice—A summarization of the school lighting requirements of 39 states; includes color of walls, exposure, window-floor ratios, intensity of artificial illumination, glare, etc.

IVES, J. E. A Review of the Current Practice of the Lighting of School Buildings in the United States. Pub. Health Rep., 43, 50: 3313 (Dec. 14), 1928.

Immunization against Scarlet Fever—A summary of the successful results in Michigan institutions in immunizing with scarlatinal streptococcus toxin.

KIEFER, G. L. The Value of Active Immunization against Scarlet Fever. J. A. M. A., 91, 24: 1885 (Dec. 15), 1928.

Antituberculosis Work—Another answer to Fishberg's attack on the policies of the N. T. A. The general principles of tuberculosis prevention are discussed and the fallacies of Fishberg's contentions are demonstrated.

KNOPF, S. A. Forty Years of Antituberculosis Work. Med. J. & Rec., 128, 11: 553 (Dec. 5), 1928.

Milk Borne Streptococcus Infections—An outbreak of unusual gastric disturbances in a school was traced to the consumption of milk from a cow with chronic mastitis.

LAIDLAW, F. W. The Epidemiology of an Outbreak of Illness Due to Milk. New York State J. Med., 28, 24: 1465 (Dec. 15), 1928.

Endemic Typhus Fever—The typhus-like disease, which is endemic in the United States, occurs chiefly along the Eastern Seaboard and Gulf Coast with occasional cases reported from the interior and the Pacific Coast. The greatest concentration of cases is found in the southeastern states, particularly Alabama and Georgia.

MAXCY, K. F. The Distribution of Endemic Typhus (Brill's Disease) in the United States. Pub. Health Rep., 43, 47: 3084 (Nov. 23), 1928.

Rural Health Work—A report of the 109 coöperative rural health projects of the U. S. P. H. S. The total of sanitary improvements effected, health educational projects completed, accomplishments in personal hygiene and correction of physical defects, and cases of communicable diseases cared for, makes a most impressive picture of real accomplishment.

LUMSDEN, L. L. Coöperative Rural Health Work of the Public Health Service in the Fiscal Year 1928. Pub. Health Rep., 43, 48: 3149 (Nov. 30), 1928.

Whooping Cough Prophylaxis—In the authors' experience, vaccine proved of little, if any, value in the prophylaxis of whooping cough. He concludes that early diagnosis and quarantine are the only effective control measures.

SAYER, L. W., and HAMBRECHT, L. Whooping Cough. J. A. M. A., 91, 24: 1861 (Dec. 15), 1928.

Preventing Rickets by Irradiation—In a group of 237 babies artificial ultra-violet irradiation was found a practical method of preventing rickets if begun early and given regularly.

SELKIRK, T. K., *et al.* Studies in Rickets. J. A. M. A., 91, 26: 2057 (Dec. 29), 1928.

Cross Connections—The paper recounts water-borne enteric outbreaks due to pollution through cross connections, acts passed prohibiting cross connections, and concludes that, although with specified check valves properly inspected, the hazard is reduced, the sensible procedure is the eventual elimination of all cross connections.

SHERMAN, C. W. Cross Connections—The Health Hazard vs. the Fire Hazard. J. Am. Water Works A., 20, 5: 615 (Nov.), 1928.

Measles Prophylaxis—The Health Department of the City of Syracuse endeavored to supply measles convalescent serum for use in children under 3 years. The principles governing serum prophylaxis are discussed in detail. It is suggested that the extremely low mortality in the large outbreak may have been, at least in part, due to the use of convalescent serum. Experiments with animal serums failed to yield positive results.

SILVERMAN, A. C. Serum Prophylaxis in a Measles Epidemic. J. A. M. A., 91, 23: 1786 (Dec. 8), 1928.

Measuring Ultra-Violet Light—A simple chemical method is suggested for the quantitative estimation of ultra-violet light in sunshine, which correlates closely with the erythema reaction of the skin. The quantity and quality of the available ultra-violet light in Chicago over a period of 16 months are measured and discussed. A most valuable paper.

TONNEY, F. O., *et al.* Actinic Measurement of Solar Ultra-Violet Light and Some Correlation with the Erythema Dose. J. Prev. Med., 2, 6: 493 (Nov.), 1928.

Problems of Old Age—The proceedings of the Annual Graduate Fortnight of the N. Y. Academy of Medicine—a symposium on the problem of Aging and Old Age—are published in this and the succeeding three issues of the Bulletin. It will constitute a valuable record which ought to be in every health library. The four issues may be purchased for $1.00.

VINCENT, G. E., *et al.* Symposium on the Problem of Aging and of Old Age. Bull. N. Y. Acad. M., 4, 11: 1062 (Nov.), 1928.

Heart Disease Studies—Of 500 children in a heart disease clinic, four-fifths had a rheumatic history, the average age of onset of which was 7 years. After 12 years the tendency to infection diminishes. The severity of the rheumatic manifestations bore no relation to the degree of heart involvement.

WILSON, M. G., *et al.* Statistical Studies Bearing on Problems in the Classification of Heart Disease. Am. Heart J., 4, 2: 164 (Dec.), 1928.

NEWS FROM THE FIELD

GIRLS' COLLEGE IN SANTIAGO

THE board of regents of the University of the State of New York has recently granted a provisional charter to the Santiago, Chile, College for Girls. This school was established in 1880, and was originally devoted to the education of girls from America and England, but was later opened to the daughters of Chilean families, many of whom now attend.

This is the second educational institution in South America chartered by the board of regents, the first being Mackensie College of Sao Paulo, Brazil.

SEWAGE RECLAIMED FOR INDUSTRIAL USE AT GRAND CANYON NATIONAL PARK

AFTER much investigation on the part of the U. S. Public Health Service, a sewage disposal plant has been erected and is now in operation on the south rim of the Grand Canyon. The experiment carried on by the federal agency has proved that it is possible to produce continuously a sewage effluent of the same quality as drinking water in so far as bacteriological results are concerned, and of better quality than the original water for generating steam. Authorities are also convinced that where there is a scarcity of water, particularly in the West and Southwest, it will be economically practicable to reclaim sewage for industrial purposes and for irrigating any kind of crops without danger of contaminating ground water or the products grown. The same degree of purification will not be required for sewage which is used for irrigation as for industrial purposes. However, sterilization will be necessary for reclaimed sewage used in growing vegetables and some other crops.

TEAR GAS USED IN FUMIGATION OF SHIPS

POISONOUS cyanogen products have been successfully tried out by the U. S. Public Health Service in the fumigation of ships arriving from foreign ports. The report recently made by the Service accentuates the advisability of using cyanogen products, which include a sufficient amount of tear gas to serve as a warning agent.

TRAVELING DENTAL CLINICS IN THE ANTIPODES

TRAVELING dental clinics giving service in the rural districts of Victoria and Queensland, Australia, have been instituted. In Victoria free dental service is given to school children until they reach the age of 12 years, and in Queensland the treatment of adults is given for a small fee. The location of the dental van is broadcast every Thursday from the Queensland radio station and the immediate itinerary of it given. The Queensland van covered 3,000 miles in 8 months.

ELEVENTH TEXAS WATER WORKS SHORT SCHOOL

THE Eleventh Annual Texas Water Works Short School was held January 14–22, and the convention of the Texas Section, Southwest Water Works Association, was held immediately following, January 23–25, at the Agricultural and Mechanical College and at Bryan, Tex. The short school was arranged under the auspices of the Texas Section, Southwest Water Works Association, the Agricultural and Mechanical College of Texas, the Texas State Department of Health, the City of Bryan and the Bryan and Brazos County Chamber of Commerce. The

school is planned each year to give the water works man of the small city an opportunity to obtain more knowledge of water and sewage treatment and to help him solve his local problems by the laboratory and lecture courses.

COURSES FOR PUBLIC HEALTH WORKERS OFFERED BY JOHNS HOPKINS UNIVERSITY

A COURSE for public health officers and other qualified persons engaged in public health work will be given at the Johns Hopkins University, School of Hygiene and Public Health, Baltimore, Md., during the third trimester, March 13–June 1. The course will include statistics, epidemiology, sanitary engineering, public health administration, bacteriology, immunology, protozoölogy, entomology, helminthology, physiological hygiene, chemical hygiene and the filterable viruses. Lectures will be supplemented by laboratory exercises and field demonstrations.

Candidates for admission to the course must be graduates in medicine or have had scientific training which will fit them for the course.

TRAGIC DEATH OF DR. SILVER AND WIFE

DR. Horatio Silver, 55, Health Commissioner of Preble County, O., and his wife were shot and killed by burglars in their home at Eaton, O., December 8. The robbers entered the bedroom of the Silvers and as Mrs. Silver rose from her bed she was killed by a bullet through her heart. Dr. Silver was shot in the stomach and died five hours later at a Dayton hospital.

A daughter aged 13 occupying a room across the hall from her parents was awakened by the shots and her screams aroused the neighbors. The murderers escaped and county police authorities have not been able to identify them from the inadequate description of them given by Dr. Silver on his deathbed. The robbers obtained only $10 in cash, taken from Dr. Silver's trousers pockets.

INFLUENZA IN LOS ANGELES

WALTER M. Dickie, M.D., State Health Officer, Berkeley, Calif., reports that Los Angeles County had had 5,182 cases of influenza up to December 1 in the present outbreak, while the total for the state under observation at that time was 8,712. In Los Angeles, 600 new cases were reported December 6, and in the first 6 days of December there were 2,821 cases, among which there had been 70 deaths.

DR. BRISTOL RESIGNS FROM MILBANK MEMORIAL FUND

LEVERETT D. Bristol, M.D., Fellow A. P. H. A., executive officer of the Bellevue-Yorkville Health Demonstration, has resigned to accept a position in the industrial health field. Dr. Bristol has been with the Milbank Memorial Fund Health Demonstrations in New York for 6 years as executive officer.

PERSONALS

DR. EDWARD T. DEVINE has been appointed director of the Bellevue-Yorkville Health Demonstration, New York, N. Y., to fill the vacancy caused by the resignation of Dr. Leverett D. Bristol. The announcement of Dr. Devine's appointment was made by Shirley W. Wynne, M.D., Health Commissioner of New York City. The local health department is using the Bellevue-Yorkville Health Demonstration district as a health labora-

tory to try out public health programs. This demonstration is one of three being financed in part by the Milbank Memorial Fund.

DR. ARTHUR H. GRAHAM, Wetumpka, Ala., head of the Elmore County health unit, has been promoted to the position of District Health Officer of southeastern Alabama, comprising 19 counties, and Dr. Lewis Roy Poole, Dothan, Ala., has become head of the Elmore County health unit.

DR. CHARLES A. DIMOND has been named city physician of Keokuk, Ia., to succeed Dr. William Frank Brown, resigned. Dr. Dimond was formerly city physician for several years.

DR. EDWARD S. GODFREY, JR., director, Division of Communicable Diseases, New York State Department of Health, has been appointed clinical professor of epidemiology of the College of Physicians and Surgeons, Columbia University.

DR. CHARLES A. WATERHOUSE, Health Officer of the Sherman consolidated health district in Chautauqua County, N. Y., since 1919, died December 5 from pneumonia.

DR. ARTHUR T. DAVIS, executive secretary of the Delaware State Board of Health, was recently appointed Health Officer of Suffolk County, Del.

DR. GEORGE H. COOMBS, director, Divisions of Social Hygiene and Communicable Disease, of the Maine State Board of Health, resigned in December to resume private practice in his former home, Waldoboro, Me. Dr. Coombs served with the Maine State Department of Health for 8 years.

DR. A. E. MCCLUE, for some time director of the full-time health unit of Hancock County, W. Va., has resigned to enter private practice. His successor is Dr. James E. Fisher of Ohio, who has done much public health work in Alabama.

DR. MARSHALL C. BALFOUR, who until October served as director of the Field Training Station for the Mississippi flood area at Indianola, Miss., has been assigned to the New York City office of the International Health Division of the Rockefeller Foundation, to succeed Dr. Charles N. Leach, who has been transferred to a European post. Dr. Balfour has had extensive experience in public health work in this country and in Europe. From September, 1926, to July, 1927, he was engaged in malaria investigations in North Carolina.

DR. ABRAHAM J. COHEN, Philadelphia, Pa., has been appointed chief of the Division of Tuberculosis of the Municipal Bureau of Health to succeed the late Dr. Thomas Mellor Tyson. Dr. Cohen has been medical director of the Eagleville (Pa.) Sanatorium for 19 years and has served also as assistant director of the Henry Phipps Institute.

CONFERENCES

February 15, Conference of State and Local Health Officials of New Jersey, Trenton, N. J.

February 21–23, Ninth Annual Convention of the Progressive Education Association, St. Louis, Mo.

February 23–March 2, Parents' Exposition, New York, N. Y.

February 24–28, National Education Association, Cleveland, O.

FOREIGN

April 3–6, Permanent International Committee on Occupational Diseases, Lyons, France.

July 13–20, Fortieth Congress and Exhibition of the Royal Sanitary Institute, Sheffield, England.

July 17–August 13, Third Vienna Summer School, University of Vienna, Austria.